THE IRON TRADE REVIEW

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Improvement Comes Slowly

But June's First Half is Better Than That of Same Period in May—Pig Iron Outlook in Several Districts More Encouraging

Improvement in finished material lines is coming slowly, but large companies report that June is making a much better record than was made during the first two weeks of May, and on the whole the outlook is encouraging. The United States Steel Corporation is operating at 65 per cent of its capacity and its orders are slightly more than 5,000 tons daily in excess of those in May.

Pig Iron

Cincinnati, which has been one of the dull spots in the country, reports some improvement in pig iron and a more cheerful feeling prevails in some other centers, particularly in Philadelphia and Birmingham. The recent buying in Chicago has subsided, to a large extent, after having developed some lower prices than had previously prevailed. There has been some shading of iron at Ironton, where sales were made on the basis of $13 to $13.25 for No. 2, but it is believed that there is now none of this low-priced iron obtainable. The offer of the Tata Iron & Steel Co. of 20,000 tons of Indian iron is at a price $1.50 above the quotation for the domestic product and there is no prospect of business resulting unless the Indian company reduces its prices.

Structural Material

Statistics compiled by the bridge builders and structural society showing that during May only 57 per cent of the capacity of the bridge and structural shops of the country was contracted for in May, as compared with 88 per cent in April, indicate the pronounced dullness in building operations requiring large tonnages of structural steel. The increase in the use of concrete is an important factor in the comparatively small tonnages of steel now being used in new buildings.

Iron Ore

The first transaction of any importance in the buying of Lake Superior ore this year by an eastern company is the closing for a block of this ore by the Alan Wood Iron & Steel Co. The movement of ore on the Great Lakes is still very sluggish. The sales are not numerous and the vessel tonnage operating is in excess of requirements.

Bars

The price of steel bars for delivery up to Jan. 1 seems to be pretty well established at 1.15c, Pittsburgh, except for prompt delivery, on which lower quotations are made. Mills are very conservative about contracting for delivery after Jan. 1, but some contracts have been made for the full year up to July 1, 1915, at 1.20c, Pittsburgh, with agricultural implement manufacturers.

Sheets Tin Plate

Operations of tin plate mills continue very active and there has been some increase in capacity in operation during the past week. There is, however, still some shading of prices below $3.30 per box, Pittsburgh. The reduction of sheets has been slightly increased in the Pittsburgh district.

Cast Iron Pipe

The contracts for the 80,000 tons of cast iron segments for East River tubes have not yet been placed, but probably will be within a few days. It is expected that this tonnage will be divided among a number of companies. Very few orders for cast iron pipe are being placed at the present time by municipalities.

THE OPEN HEARTH

An Insult to Business Men

THE right of petition is sacred. Regardless of what President Wilson and all the politicians may say, the business men of this country have a right to express their opinions and to forward to the capitol or the White House protests against pending legislation. To attempt to deny them this right is to insult the great multitude of business men of the country.

Is it any crime to say, as the Simmons letter given to the press by President Wilson does, that "what the country needs is a quiet time—an absolute rest from the agitation of politics and assaults upon business"?

Is there anything reprehensible in saying that "we earnestly hope that Congress may be convinced that it has done enough law-making for the present"?

Are business men to be condemned for declaring that the country is "absolutely tired and surfeited with political agitation"?

Nothing more objectionable than the sentences just quoted was contained in the documents made public by the President.

John Adams obtained his greatest fame after he left the White House by standing up as a member of the House and insisting upon the right of petition. Has President Wilson forgotten this chapter of history?

Business men everywhere will resent the insult hurled at them and will continue in the future as in the past to express their opinions to their public servants.

They will also be heard from at the polls.

Our advice to every business man is: Express your honest opinion freely, frankly and vigorously on any public measure, especially to members of the Senate who may be induced to vote against some of the objectionable features of pending bills. But do not sign any stereotyped protest or let any other man write your opinion. Let your letter or telegram have some individuality. That is the only kind that has influence with thinking men.

The Armor Plate Rider

YEARS ago it was recognized in Congress that legislation by means of "riders" was highly objectionable. The "rider" is a provision for general legislation which is not a necessary part of the appropriation bill, but is attached to it and often for the reason that it would not be enacted if considered on its own merits. In order to prevent this method of legislation, both the House and Senate have for years had a rule against attaching general legislation to appropriation bills.

In spite of this rule, however, and sometimes in defiance of it, legislation by the "rider" method is resorted to. One of the best known cases of this kind was the provision attached to an appropriation bill that no part of the money appropriated should be used in prosecuting labor unions for violation of the anti-trust law. Another striking illustration of "rider" legislation has just been furnished by the armor plate provision of the naval appropriation bill.

In the House of Representatives, Speaker Clark ruled that the armor plate provision was out of order. When the bill came up for consideration in the Senate, the armor plate provision again appeared. Senator Oliver raised the point of order that it was general legislation and Vice President Marshall sustained the point. This apparently ended the matter, when, low and behold! a few days later another armor plate amendment to the appropriation bill appeared. This amendment certainly was general legislation if the first one was. It differed from the original plan by providing for a committee of three to investigate and report a suitable site for the erection of the armor plate plant instead of simply authorizing the secretary of the navy to investigate and report. The new provision also provided for an appropriation of $5,000 to pay the expenses of the committee. Senator Oliver again objected, making the point of order that the amendment was general legislation. Vice President Marshall then proceeded to reverse himself and held that the new amendment was not general legislation. The only explanation that can be given for this remarkable performance of the vice president is that it was due to party ex-

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pediency. From a parliamentary standpoint, Mr. Marshall's position is indefensible.

The armor plate provision is damned not only by its lack of merit, but also by the very objectionable manner in which it was jammed through the Senate.

Make Your Repairs Now

IN PEACE, prepare for war, and by analogy, in times of business depression get ready for the busy seasons to follow. The first requisite of a successful campaign in a busy year is to have your plant in the best possible physical condition and to attain this end most economically, it is good practice to make heavy repairs and extensions in dull times. At such times, both labor and material are cheap and construction work can be prosecuted with a minimum of interference with manufacturing operations. That this policy is considered sound by the management of some of the most progressive iron and steel manufacturers in the country is attested by the following short articles written by request of the engineering editor of THE IRON TRADE REVIEW:

BY H. J. STEINBREDER,

Vice President Laclede Steel Co., St. Louis.

There is no question but that extensive repairs and improvements can be made at a much lower cost and to much better advantage in every way during the dull season, as material and equipment can be purchased at a lower price, labor is more efficient and obtainable at a lower rate, and repairs and improvements can be made without hinderance to the plant operation.

BY E. R. CRAWFORD,

President McKeesport Tin Plate Co., McKeesport, Pa.

We think you would have no trouble in pointing out how large amounts of money could be saved by taking advantage of dull seasons for the making of necessary repairs, improvements, and new construction work. We believe it would be decidedly advantageous to take advantage of such seasons for the following reason:

First: On account of lower prices for materials.

Second: On account of the large amount of labor looking for employment in dull seasons and which means much more efficiency than when labor is fully employed.

Third: Work of any kind can always be expedited much more in dull seasons on account of there being less demand both for labor and materials.

It is our opinion that the above reasons alone would well compensate for the taking up of repairs, improvements and new construction work in dull times as against busy seasons.

BY CHAS. R. HOOK,

General Superintendent American Rolling Mill Co., Middletown, O.

We have been so busy during the past ten years adding to our plants, in order to take care of the increased demand for our products, that the question of a policy which might govern the time at which improvements and extensions should be made has never presented itself in just the way I should imagine you would want it covered. "Necessary repairs" must be made at whatever time they show their need, whether it is a time of depression or of extreme good markets, providing, of course, you are operating. During the past 11 years of my connection with this company, there has been no period during which we were shut down, so that we would be confronted with the problem of shutting up tight, or of making what seemed to be advisable improvements or extensions.

Undoubtedly the time to make heavy repairs and improvements would be at a time of depression, when the prices of materials entering into the repairs and improvements are low, and the plant being idle, these matters can have the undivided attention of the engineers and operators, who, during good times, have about all they can do to run their departments efficiently, provided, of course, the particular plant is not over-organized.

"Nipper" Anderson, one of the dynamiters who has been out on bail for many months, has been convicted of assault and battery in a Cleveland court, because he could not control his brutal tendencies even when at large by grace of the United States Court. The spectacle of these dynamiters roaming about the country after having been duly convicted and sentenced, and the sentences approved by the highest courts, is a disgrace to the American people. How long, Oh! how long is it to be continued?

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for June, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for May, 1914.	Average for March, 1914.	Average for June, 1913.
Bessemer pig iron, Pittsburgh..	$14.90	$14.90	$15.15	$17.26
Basic pig iron, Pittsburgh.....	13.90	13.90	13.96	15.46
No. 2 Fdy. pig iron, Pittsburgh	13.90	14.09	14.15	15.04
Northern No. 2 Fdy., Chgo....	14.00	14.25	14.25	16.00
Lake Superior Charcoal, Chgo..	16.00	15.75	15.50	16.75
Malleable Bessemer, Chicago...	14.00	14.25	14.25	15.75
Southern No. 2, Birmingham...	10.25	10.50	10.50	10.70
Southern Ohio No. 2, Ironton.	13.50	13.50	13.50	14.70
Basic, eastern Pa.....	14.00	14.00	14.25	16.00
No. 2X Virginia furnace.....	12.75	12.75	12.75	13.75
No. 2X Foundry, Philadelphia.	14.75	15.00	15.00	16.25
Ferro manganese, Baltimore....	38.00	38.00	38.50	61.00
Bessemer billets, Pbgh. & Ygn.	19.50	20.00	21.00	26.50
Op. h'th billets, Pbgh. & Ygn.	19.50	20.00	21.00	26.50
Bess. sheet bars, Pbgh. & Ygn.	20.50	21.00	22.00	27.50
Op. h'th sh. bars, Pbgh. & Ygn.	20.50	21.00	22.00	27.50
Steel bars, Pittsburgh.....	1.12½	1.15	1.20	1.40
Iron bars, Philadelphia.....	1.17	1.22	1.25	1.52
Steel bars, Chicago.....	1.28	1.29	1.38	1.58
Tank plates, Chicago.....	1.28	1.29	1.38	1.63

	Today's prices.	Average for May, 1914.	Average for March, 1914.	Average for June, 1913.
Structural shapes, Chicago....	$1.28	$1.29	$1.43	$1.63
Iron bars, Cleveland.....	1.20	1.25	1.30	1.65
Iron bars, Chgo. mill.....	1.10	1.10	1.57	1.55
Beams, Pittsburgh	1.12½	1.15	1.20	1.45
Beams, Philadelphia	1.25	1.30	1.30	1.60
Tank plates, Pittsburgh.....	1.10	1.12½	1.20	1.45
Tank plates, Philadelphia.....	1.25	1.25	1.30	1.75
Sheets, blk., No. 28, Pittsburgh	1.80	1.87	1.95	2.28
Sheets, blue an., No. 10, Pbgh.	1.35	1.37	1.40	1.75
Sheets, galv., No. 28, Pbgh....	2.75	2.80	2.95	3.39
Wire nails, Pittsburgh.....	1.50	1.57	1.60	1.78
Connellsville fur. coke, contr...	1.85	2.00	2.00	2.25
Connellsville fdy. coke contr...	2.40	2.50	2.50	3.00
Heavy melting steel, Pbgh.....	12.00	12.00	12.25	13.06
Heavy melting steel, east'n Pa.	10.75	10.75	11.25	12.50
Heavy melting steel, Chgo.....	9.75	9.95	9.80	12.00
Heavy cast, eastern Pa.....	12.50	12.50	13.00	13.50
No. 1 wrought, eastern Pa.....	12.50	12.50	14.50	15.50
No. 1 wrought, Chgo.....	9.00	8.63	9.00	11.25
Rerolling rails, Chgo.....	11.25	11.25	11.25	14.00
Car wheels, Chgo.....	11.25	11.38	11.75	17.00

(For Additional Prices See Page 1108.)

Pig Iron Market is More Active

In the Cincinnati District—Lower Prices Developed in Chicago—Indian Iron Offered in the East

One southern Ohio furnace quietly sold several thousand tons during the latter part of last week at $13 and $13.25, Ironton basis, No. 2 foundry, for last half delivery. This furnace does not usually make foundry iron for merchant purposes and therefore had only a limited amount to dispose of. This has all been sold and the market has been advised that no more can be had at these figures. The prevailing price today is given at $13.50, Ironton basis, for No. 2 foundry, for the last half and it is not known that any of the merchant furnaces in this territory have accepted anything less.

Demand and sales are heavier than last week and the general tone of the market is a little better. Among inquiries is one for 2,000 tons of basic iron and 1,000 tons of foundry iron, both from central Ohio, and the Davis Sewing Machine Co., Dayton, O., is asking for 450 tons of northern and 450 tons of southern iron. The Standard Sanitary Mfg. Co. is inquiring for 1,000 tons of No. 2 and 1,000 tons of No. 3 foundry, for its Louisville plant. One thousand tons of special iron has been sold to a southern Indiana engine maker, and 1,000 tons of Virginia iron, 750 tons of silvery iron and 500 tons of northern foundry iron have been closed for delivery into Michigan territory.

Southern prices are unchanged at from $10.25 to $10.50, Birmingham basis, for No. 2 foundry iron, for third and fourth quarters shipment.

Pig Iron Lower at Chicago

At Chicago, appearances indicate the buying movement which seemed to be under way during the past month has nearly reached its limit for the present. Its principal effect seems to have been to bring out a lower range of prices and it is not of sufficient volume to give furnace men an opportunity to increase prices after a backlog has been obtained.

Basic buyers who figured extensively in the market within the past six weeks have taken considerable tonnage, some of it quietly, and an aggregate of probably 60,000 tons has been placed with northern makers.

Demand for foundry and malleable iron has not been as keen as for basic and at no time has the inquiry been heavy. At present inquiries before the market range from car lots to 1,000 tons, but practically nothing larger than the latter quantity. Makers who have been holding firmly at $14.25 for third quarter delivery and 50 cents higher for fourth quarter in some instances now are quoting $14, Chicago furnace, for both foundry and malleable for third quarter delivery, but are resisting vigorously efforts to extend this price beyond Sept. 30.

Open quotations of $14, Chicago furnace, for No. 2 foundry and malleable, are being made by several furnace interests while at least one still holds firmly to $14.25, Chicago furnace.

Practically every seller is carrying on his books a large tonnage bought in January and February which has not been taken by melters during the contract period and serves as a damper on the market for last half. Under this condition, makers are refusing to sell large tonnages to melters who are already on the books for considerable quantities, to avoid carrying present prices into fourth quarter in the same way iron for first half is being carried over into third quarter.

Southern iron prices are softer and $10.25, Birmingham, is being quoted openly, while $10.50 is held by some interests. Rumors of $10, Birmingham, for No. 2 foundry are heard, but in several instances when traced back were found to apply to analysis which would not justify quoting this price on No. 2 foundry.

Lake Superior charcoal iron is prob-

(*For complete prices see page* 1108)

ably the firmest item in the market and remains quotable at $15.75 to $16.75, Chicago, for Nos. 1 to 6, for full last half delivery.

Nothing bordering on a buying movement is apparent in the St. Louis pig iron market. Inquiries are few and are confined to small lots for immediate shipment. Southern No. 2 continues to be quoted all the way from $10.25 to $11. Northern iron is unchanged in prices.

Nothing has occurred in the Cleveland district to relieve the dullness that has existed for several weeks. One large firm has, however, sold more pig iron in the first half of the month than in the same period of last month. Foundries will carry over into the last half considerable tonnages of pig iron which should have been delivered before July 1.

Standard Sanitary Figures

The Standard Sanitary Mfg. Co., Pittsburgh, has entered the Greater Pittsburgh market for between 500 and 1,000 tons of No. 2 foundry iron for shipment to each of its two plants in that district, and is also negotiating for a similar tonnage for delivery to its works at Louisville, Ky. No. 2 northern iron has been going all the way from $13.90 to $14.40, Pittsburgh, the last three weeks. Except for this inquiry, the Pittsburgh market is devoid of any activity, having not yet been influenced by activity prevailing in the east. Steel making grades are quiet.

Buffalo Market Quieter

The sales of the Buffalo furnaces for the week amounted to about 14,000 tons of all grades, the bulk of the tonnage going out of the district. A New York state coupler company purchased 5,000 tons of basic and 6,000 tons of foundry irons went to Canadian users. There is a considerable amount of inquiry from consumers outside of the district, but the local market situation seems to be quieter. The melters of the territory tributary to Buffalo, excepting those across the border in Canadian centers, report a state of dullness.

Differentials have been practically erased as to grades in the matter of prices. The range is from $13.00 on the low silicon irons to $14.00 as the top price being obtained for No. 1 foundry.

Broader Buying at Philadelphia

A more widespread buying movement in pig iron has developed at Philadelphia and surrounding territory which is imparting a little more cheerful tone to the situation. Much of the buying and inquiry is in small lots. Consumers apparently are keeping their third quarter and last half estimates of requirements closely to the current rate of melt and are not speculating. Prices exhibit no buoyancy, but concessions are now of the few cents order. Most sales of the week have been of foundry and low phosphorus irons. In standard low phosphorus, the recently nominal figure of $21, Philadelphia, has eased off to $20.50 on the more attractive lots. Sales closed include last half lots of 3,000 tons to this district, 1,500 tons for New York state delivery and smaller transactions in addition to 1,500 tons of small orders in Lebanon brands, the latter at $17.50 furnace. Considerable inquiry for low phosphorus is open and English hematite is being quoted in some of these cases. The English grade comparing with strictly standard domestic iron is held at about $21.50, Philadelphia, while slightly inferior metal is offered at $20.50, Philadelphia. The Norfolk & Western railroad, figuring on 2,000 tons of Bessemer, foundry and charcoal grades, has placed the Bessemer with southern Ohio and the foundry with Virginia makers. The Southern railway asks 500 to 1,000 tons for Lenoir City, Tenn. Soil pipe makers at Salem and at Hainesport, N. J., are asking for 1,500 tons and 1,000 tons of No. 3 respectively. A Trenton consumer wants 600 tons. A Virginia pipe maker took 1,000 tons of low grade southern iron for shipment into the Birmingham district at $10.50 for No. 2 basis. The United States Cast Iron Pipe & Foundry Co. has made no farther round purchases of southern iron, but remains a prospective buyer. Virginia iron sales have been better following the announcement of a $12.75 furnace price for last half. Basic is quiet, though a Harrisburg consumer is figuring informally. The Earlston, Pa., furnace has gone out and the Temple stacks will follow soon.

Indian Iron Offered

Renewed attention to the prospects for importing Indian pig iron, is being given in the New York market, because of the recent presence in this country of representatives of the Tata Iron & Steel Co., of Sakchi and their efforts to interest merchants in this metal. The Tata company is offering 20,000 tons of grades corresponding to domestic No. 2X, 2 plain and 3 and basic for delivery this year, but ask a price of $16, tidewater, which is at least $1.50 above the present market for domestic brands. Unless the Indian company reduces its price, it is not thought that any importations will result under present conditions. The New York iron market continues to show fair activity, though sales were not so large last week as the week preceding. A Poughkeepsie buyer has closed for 1,000 tons of No. 2X with a Buffalo maker and 1,000 tons of No. 2 plain with a Central Pennsylvania furnace, both for last half. The reported prices were $14.50, delivered, for the high silicon and slightly lower for the No. 2 plain. A Bridgeport buyer figuring on 2,000 to 3,000 tons of foundry and 2,000 tons of malleable, last half, is seeking a price of $15, delivered, equivalent to about $12.50, Buffalo basis, but has not been successful in obtaining this concession. A pipe maker took 1,000 tons of low grade iron from an eastern Pennsylvania furnace. A Newark, N. J., furnace manufacturer increased a recent order from 500 to 1,000 tons. New inquiries include 1,500 tons of foundry grades for the International Steam Pump Co. for Holyoke, Mass.; 1,000 to 2,000 tons of special iron and 1,000 tons of foundry iron for this district; an indefinite negotiation, involving 3,000 to 5,000 tons, for a local buyer, 1,000 tons for export and other lots. One of the foundries competing for the East river segment castings has been figuring with southern makers on a block of 50,000 tons. Conflicting reports regarding prices in the Buffalo district are current. While there seems to be no question that the $13 furnace level for No. 2X recently has been shaded, that figure continues openly to be asked. Certain brands of eastern No. 2X have been quoted in the week as low as $14.50, tidewater.

Cheerful at Birmingham

During the week No. 2 pig iron, Birmingham, has maintained the $10.25 quotation for spot delivery. While no large sales of Birmingham iron were reported during the week, inquiry from the middle west and northern states was active and the cheerfulness aroused by the big business of two weeks ago still prevails.

Practically no business for future delivery is being done in Birmingham, furnace men stating that nearly all orders call for immediate delivery. An advance in quotations is expected by southern makers within the next few weeks, if the present improvement in the market continues to develop as it has started.

Business of the week was made up almost entirely of small orders of a few hundred tons each to machine manufacturers, stove foundries, etc. One local maker hinted that there was another large concern in the market making active inquiries, but stated that no order had yet been placed.

(*For complete prices see page* 1108)

Sheets Hold Their Own

In Chicago—Increased Output in Pittsburgh District

No particular change is evident in the sheet market in Chicago, although makers feel somewhat better as to the outlook than a short time ago. Larger tonnage is being booked and local mills are running on a slightly increased schedule, but the total fails to reach a mark sufficiently high to have an effect on quotations.

Continual weakness of spelter has had the effect of lessening the quotation on galvanized sheets and No. 28 gage galvanized is now quoted at 2.93c to 2.98c, Chicago, while No. 28 black continues at 1.98c to 2.03c. While rumors of slight shading of these quotations are heard from time to time, it is believed there is slight foundation for believing any considerable tonnage is going at prices below those mentioned.

Firmer at Cincinnati

At Cincinnati the sheet situation is a little firmer, but prices have not shown any inclination to advance. One encouraging feature is that numerous buyers are closing at figures quoted them the first time without claiming to have received lower prices from other sources. It is generally stated that the market is as low as it can go and that prices will remain where they are until an advance takes place. Black sheets No. 28 gage are quoted at from 1.90c to 2c, galvanized No. 28 gage at from 2.85c to 2.95c and blue annealed No. 10 gage at 1.55c, all Cincinnati basis.

Shading Continues in East

Reports of shading of 1.35c, Pittsburgh, for No. 10 gage blue annealed continue to come out in the east and these seem attributable to mills both in the Eastern Pennsylvania and in Pittsburgh districts. Leading eastern Pennsylvania sheet makers, however, refrain from naming below 1.35c, Pittsburgh, or 1.50c, Philadelphia, and yet have been able in recent weeks to book up to full capacity. Sheet buyers in eastern Pennsylvania are beginning to show some interest in last half contracts.

Sheet Mills Increase Output at Pittsburgh

The market for steel sheets in eastern Ohio and western Pennsylvania has reflected a better tone the last two weeks. Specifications and new orders have been coming out in better volume, some makers reporting the heaviest demand since February. Car builders have been figuring needs more extensively, and the same is true with reference to some automobile makers. The American Sheet & Tin Plate Co., which had been operating sheet mills at from 50 to 60 per cent capacity several weeks, last week increased output to 63 per cent of capacity; independent mills, in many instances, are exceeding 65 per cent. Prices are unchanged; concessions continue to be offered when attractive tonnages are involved. Leading makers are refusing to sell for extended delivery, which leads to the belief that quotations will go no lower.

The sheet metal producing interests of the Buffalo district are booking all the tonnage they are able to handle. Local mills are running on full time.

Plates for Steel Cars

Bring Round Tonnages to Steel Companies—Bidding on Plates for Panama

Recent car orders are releasing to the mills some round tonnages of plain material, largely plates, in the New York market. The American Car & Foundry Co. has placed 18,000 tons of material with a Pittsburgh independent mill at a reported low price, and at last reports still was figuring on 40,000 tons additional to cover the New York Central cars, recently taken by this builder. The T. A. Gillespie Co., which has taken 1,400 tons of plate work in connection with the construction of the new East river tubes, has placed the steel with an eastern Pennsylvania mill. The American Car & Foundry Co. also has placed 5,000 tons of car material, with an eastern Pennsylvania independent mill, and several thousand tons with another eastern producer. The plate market in New York is quoted at from 1.26c to 1.31c, delivered.

Eastern Pennsylvania and Pittsburgh plate makers are figuring upon 4,500 tons of punched plates for the government for shipment to Panama, bids for which will be opened on half portions June 19 and 25. These plates are for cylinder construction. Eastern Pennsylvania plate makers report practically no improvement in their bookings, and are maintaining operations at about 60 per cent on odd lots. Some tentative tonnage remains in the eastern market for the shipyards. Prices remain at 1.25c to 1.30c, Philadelphia, or 1.10c to 1.15c, Pittsburgh. Prices of 1.20c, mill, have recently been quoted by eastern producers on light plate for western shipments.

Plates Slightly More Active at Pittsburgh

Moderate activity has been enjoyed by plate manufacturers in western Pennsylvania, but there has not been enough improvement to change mill operating schedules. Production is estimated between 50 and 60 per cent capacity. Probability of an early decision of the freight rate question has caused a slightly better feeling, but, in the main, there is no change in the actual situation. Plates continue to be offered at 1.10c, but consumers apparently have abandoned hopes of breaking that figure.

Plate Situation Unchanged

Buying of large number of cars by eastern and western railroads has had some effect on the plate market in Chicago, although this factor has not been sufficient of itself to increase quotations. The effect is purely sentimental, together with a slightly increased demand from various other sources which is making the tonnage of this product a trifle more steady than has been the case for several weeks. While an occasional sale is made at 1.25c, Chicago, the market rules steadily at 1.28c to 1.33c, for the general run of business.

Ferro Market Dull

The eastern market on ferro-alloys remains bare of any sizeable transactions. Ferro-manganese continues only in carload demand and sales for such quantities are being done at $38, seaboard.

Alloys Unchanged at Pittsburgh

There is no change in the situation for ferro-manganese and other alloys in western Pennsylvania. Sellers report light inquiry and quotations are unchanged.

Tin Plate Stocks Cut

Tin plate operations have been slightly increased the last week or 10 days in eastern Ohio and western Pennsylvania. The American Sheet & Tin Plate Co. is operating tin plate mills at 93 per cent of capacity. Mills able to accumulate surplus tonnages early in the year have been reducing stocks this month. There is some new buying, and the $3.30 price for base size is being shaded when attractive tonnages are involved.

(*For complete prices see page* 1108)

Bar Outlook is Better

In the Chicago District—More Activity in the East—Some Contracting

A somewhat better feeling is evident in the Chicago market for finished steel products and steel bars are in somewhat better demand than has been the case. The tonnage is coming from a wider territory and from a large number of buyers, everyone apparently needing some additional supply but none being willing to obligate himself until matters are somewhat more definitely settled. However, the generally improved sentiment is bringing out sufficient business to make the market look several shades better, although the total tonnage is not yet sufficient to have an effect on prices beyond giving a trifle more firmness to present quotations. Bars are still quotable on a basis of 1.28c to 1.33c, Chicago, although an occasional lot of unusually attractive sort has been known to bring out 1.25c, Chicago.

Bar Steel No Better at Pittsburgh

John F. Casey, who was awarded the contract for the filter plant on the West Side, Cleveland, has given the order for concrete reinforcing bars, about 2,000 tons, to the Carnegie Steel Co., Pittsburgh. Western Pennsylvania and eastern Ohio bar steel makers have not noted much change in the situation. Despite efforts to hold the market at 1.15c, tonnage continues to be obtained at 50 cents and $1 a ton under that price, but only when prompt delivery is involved, so far as can be learned. Bar mills are running at about 50 per cent capacity.

Bar iron at Pittsburgh is quotable at 1.25c, or $1 a ton under the nominal quotation previously prevailing. Reports continue to be heard that outside makers are willing to shade 1.25c for delivery at this center.

Eastern Iron Mills Dull

Operations among the eastern Pennsylvania iron mills remain upon a low ebb. Some plants are idle, others are running from 30 to 50 per cent and the Pottstown, Pa., mills are doing little. Common iron bars of attractive lots can be had at 1.15c, Philadelphia, and smaller sales are going at 1.17c and 1.20c, Philadelphia. Business is light.

Better Buying Continues in East

A better movement of steel bars in both new business and specifications continues in eastern Pennsylvania. Last half contracts involving several thousand tons additional have been closed by western makers at 1.30c, Philadelphia, or 1.15c, Pittsburgh. A Lebanon, Pa., consumer took 500 tons of nut stock from a western maker at 1.15c, Pittsburgh. A Milton, Pa., buyer asks 2,000 tons of nut steel for last half. The 15,000 to 20,000 tons of axle bars for Wilkesbarre, Pa., still is open. Other negotiations for implement manufacturers and for other classes of consumers remain under way.

Implement Makers Closing Contracts

Two implement manufacturers in the New York City district, who normally require about 15,000 tons of bars annually, now are more actively figuring with makers upon these requirements. These contracts are expected to be closed shortly. Steel makers with headquarters in New York have booked some bar contracts with western implement makers for delivery up to Jan. 1, on the basis of 1.15c, Pittsburgh, and a heavy tonnage remains under negotiation. There is more buying of bars by the smaller trade in the metropolitan district, at the same market range of 1.31 to 1.36c, delivered.

Bar Inquiry at Buffalo

Mills and agencies in the Buffalo district report an improvement in the amount of inquiry for bars, but the mills, in considering the contract needs of users, have adopted a waiting attitude, not being too ready to accept contracts on the present price basis. Orders for immediate needs are coming in at the same pace previously noted. Specifications are being accepted subject to mills' convenience and that is equivalent to immediate delivery. Producers are endeavoring to maintain prices at 1.15c, base, but some shading is reported where the tonnage and the deliveries are attractive.

Anxious to Contract

In the Cleveland district agricultural implement manufacturers are showing continued interest and a desire to contract as far as possible. The ruling quotation for delivery up to Jan. 1 is 1.15c, Pittsburgh, and mills are not disposed to contract beyond that period. It is understood, however, that some contracting for the full year up to July 1, 1915, has been done at 1.20c, Pittsburgh. Bar iron is extremely dull and iron mills are now operating intermittently.

Iron Bars Holding Position

The market for iron bars in the Chicago district continues on practically the same basis as has been the case for several weeks. Specifications and new orders are coming in moderate volume and mills find sufficient tonnage for continued operation in a hand-to-mouth way. Quotations remain steady at 1.10c to 1.12½c, Chicago, but mills are unwilling to contract for future delivery at this rate and buyers are not averse to remaining uncovered and take their necessary supply in the spot market.

Hoops, Bands and Cotton Ties Unchanged

There is no change in the market for hoops and bands at Pittsburgh, although reliable reports are heard that the latter can be obtained at 1.12½c and even as low as 1.10c. Hoops are nominally quoted at 1.25c. Cotton tie prices for 1914 have not been announced. Cold-rolled shafting is showing irregularity, now being quoted at a spread from 66 to 67 off. Sales at less than 67 off are rumored.

Billet Prices

Are Weak—Low Quotations Appear in the East

Lower prices on billets have appeared in eastern Pennsylvania where $21.90, delivered, or $19.50, Pittsburgh, on rolling steel was named and this figure was shaded on a lot of about 1,000 tons. The order is said to have gone to an eastern Pennsylvania mill with some freight advantage. A Scranton consumer asks for 1,000 to 1,500 tons of axle billets, last half. Current specifications with eastern Pennsylvania makers hold up well and incoming tonnage, and shipments are well balanced. Consumers still show no disposition to contract. Forging billets at Philadelphia and vicinity are held at $4 to $5 above rolling steel.

Billet and Sheet Bars Decline at Pittsburgh

Although it is difficult to find trace of actual sales in the open market, manufacturers of billets and sheet bars in western Pennsylvania and eastern Ohio admit that attractive tonnage for prompt shipment can be obtained at about 50 cents under the previously prevailing nominal prices. Billets are quotable at a range from $19.50 to $20, and sheet bars from $20.50 to $21, maker's mill. Wire rods and muck bar are nominally quoted.

Operations Resumed at Ashland

The Ashland Steel Co., Ashland, Ky., has resumed operations in all departments after a shutdown of about one month. Demand is not very heavy, but this company has secured sufficient orders to run it for several weeks. Wire rods and billets are quiet at $25 for the former and $20 for the latter, Ashland basis.

(*For complete prices see page* 1108)

Scrap at a Stand-Still

Few Transactions and Price Changes Are Not Important

With the summer vacation season and the closing down of mills for repairs almost at hand, the scrap market in Chicago remains almost stationary with some slight changes in quotations from week to week. Transactions are small and tonnages restricted. Some rolling mill grades have shown an advance of 25 cents per ton, but this is without particular significance.

Railroad offerings total about 6,000 tons as follows: Illinois Central, 1,670 tons; Soo Road, 575 tons; Union Pacific, 2,600 tons; C., P. & St. L., 575; Chicago, St. P., Minneapolis & Omaha, 900 tons.

All scrap iron dealers are playing a waiting game in the St. Louis market, believing that the action of the Interstate Commerce Commission will play an important part on prices. No lists of consequence are out this week, and prices are unchanged. The steel mills continue to ask for scrap in limited quantities.

Slow at Cincinnati

At Cincinnati, demand in the scrap iron market is even less this week than has been the case during the past month, if such a thing could be possible. Sales are at a minimum and the outlook for a resumption of buying even in small lots is not bright. Foundries that have not bought scrap requirements for a long time state that they are well supplied, as they have been running far below capacity since the first of the year. No change is reported in quotations.

Eastern Market Holds Sluggish

No important change has appeared in the eastern Pennsylvania scrap market and the sluggish conditions of recent weeks still prevail. Sales are small and light in total. Some consumers of heavy melting steel including Coatesville buyers are holding up shipments against old orders. One steel maker is offering $10 delivered, for steel which is considerably below the market. Brokers are offering $9.50, delivered, for wrought pipe. Prices largely are nominal.

Metropolitan Market is Stagnant

Price limits in the old material market at New York City are difficult to ascertain under present conditions, for transactions of any importance are few and, in most respects, the market is practically stagnant. More carload sales than otherwise are being made. Some large eastern Pennsylvania buyers have have been declining to pay $9.50, delivered, eastern Pennsylvania, for wrought pipe. Heavy steel is very slow at around $10.75, delivered eastern Pennsylvania. The old Western Union building, New York City, is being offered for bids and is expected to contain a considerable tonnage of iron scrap.

There is very little scrap moving in the Buffalo market. Situation reported to be quiet, only trading being in small tonnage lots. Some suspensions have been received from consumers on orders under contract. The principle activity is in borings and turnings, owing to the fact that the production of these lines has been curtailed and the demand is about equal to the present supply.

Scrap Dull at Pittsburgh

The old materials market in western Pennsylvania offers little of interest. Jobbers complain about small margins of profit and absence of demand. Prices of most grades are nominal. The embargo against the La Belle Iron Works, Steubenville, O., has not been lifted.

Concessions on Coke

Made on Foundry Grades—Contracts Made at $2.50 Ovens

There is not much change in the Connellsville coke situation. Some operators continue to ask $2, ovens, for contract furnace coke, but others are willing to sell at 10 and 15 cents a ton under that figure. Consumers do not appear anxious to buy and it appears as if furnaces will continue covering needs from month to month or from quarter to quarter, rather than closing contracts for six or 12 month periods. Standard foundry coke is being offered at $2.50, ovens, for delivery over the next 12 months, which represents a concession of 25 cents a ton in some instances; a few operators are asking $2.65, ovens. Oven operations are estimated at about 50 per cent capacity, according to the *Connellsville Courier*. Production the week ending June 6 was 243,609 tons, says the *Courier*, a decrease of 419 tons compared with the week before.

In the Cleveland district, foundries are contracting for their requirements and $2.50, ovens, is being paid, whether the contract is for six months or for one year. One large company refuses, however, to contract at $2.50 for more than six months.

Foundry Sales at Cincinnati

At Cincinnati, contracting for foundry coke has been heavier during the past week. Demand is coming from all parts of this territory and while individual orders are not generally large, the aggregate tonnage is in excess of that of last week. Deliveries in most cases are for 12 months ahead. Furnace coke is selling spasmodically in small lots only. Prices are unchanged from those of last week, being from $2.25 to $2.75 for Wise county foundry, $2.25 to $2.40 for Pocahontas foundry and from $2.75 to $3.50 for New River foundry coke.

Coke is very dull in the St. Louis territory, and prices are unchanged since last week's report.

Lake Ore Bought

For Shipment to an Eastern Plant—Cuban Shipments

The Alan Wood Iron & Steel Co. has purchased a round block of Lake Superior, non-Bessemer ore, for delivery to its Swedeland, Pa., plant during the present season. The tonnage has not been stated. As far as learned, this represents the only important sale of lake ores yet made to eastern furnaces. Some scattered sales of Lake Superior manganates have been made to eastern consumers, but these have been of a smaller amount than in former years. There is no active interest among eastern buyers at this time in foreign ores and practically no sales are being made. The Spanish-American Iron Co. at present is shipping to this country only about 40,000 tons monthly from its Cuban mines, which is less than half of capacity.

Wire Products Quiet

The market for wire products in western Pennsylvania and eastern Ohio is quiet, and indications are that it will continue so until autumn buying begins. Mills are entering the dull summer months with not much backlog tonnage on their books. Prices are unchanged, with nails quotable at $1.50 and plain wire at $1.30.

(*For complete prices see page* 1108)

Reduction in Activity

In Structural Shops Shown by Statistics—Some Mills Report Improvement

At the monthly meeting of the Bridge Builders and Structural Society, held in St. Louis, June 11, it was shown from careful reports collected by its secretary, that during the month of May, 57 per cent of the entire capacity of the bridge and structural shops of the country was contracted for. This is a loss over April of 31 per cent, as in the previous month, the reports of the society showed 88 per cent of the capacity engaged. In March, according to similar reports, 76 per cent was booked. Awards of the week in the New York market run about 14,000 tons, but of these all but 2,000 tons is for subway construction. The general run of lettings about the metropolis is less than recently and new offerings do not make so good a showing. Some of the mills, however, report better specifications as a result of recent awards. The plain material market at New York remains at from 1.26c to 1.31c, delivered.

Some Eastern Mills Doing Better

Some eastern Pennsylvania structural shape mills are booking new business and specifications at an increased rate in the Philadelphia territory, much of which is for small jobs. The situation is spotted, however, as other eastern Pennsylvania mills report no improvement. Tonnages of considerable size now coming out in the Philadelphia district continue few. Prices for shapes at Philadelphia are unchanged at 1.25c to 1.30c, delivered, or 1.10c to 1.15c, Pittsburgh.

Demand Structural Heavier at Pittsburgh

Western Pennsylvania manufacturers of structural shapes say demand has improved moderately the last two weeks, but there has not been enough activity to affect mill operations. Shapes are being held at 1.15c by some makers, but that figure continues to be shaded 50 cents and $1 a ton in isolated cases. Fabricators report better inquiry, but actual orders are no heavier.

In the Cleveland district, the general contract for the Wm Bingham warehouse calling for 1,600 tons of shapes and 2,100 tons of bars has been awarded to the Crowell-Lundoff-Little Co., but the contract for the steel has not yet been placed. Bids are being received by W. J. Carter, engineer in the Rockefeller building, Cleveland, for a new foundry for the Federal Foundry Co., Indianapolis, which will require about 700 tons of structural material. Bids for the Brooklyn-Brighton bridge will be advertised for by the commissioners of Cuyahoga county within a few days. It is expected that the 600 tons of steel required for the repairs on the central viaduct for which the King Bridge Co. has the contract, will be taken on a requirement contract.

Pacific Coast Takes Shapes

About 5,000 tons of structural shapes were placed last week in the Chicago district, by far the greater majority of projects being located in the Pacific Coast. The largest tonnage, the Lake street bridge in Chicago, amounted to about half the total placed for the week, the other projects being for small quantities of steel. There has been no change in the market situation and structural shapes continue on a basis of 1.28c to 1.33c, Chicago.

Railroad Building Contract

The Paul J. Kalman Co., St. Paul, Minn., has just been awarded the contract for 2,000 tons of reinforcing steel for the new railroad building to be erected in St. Paul by Grant, Smith & Co., general contractors. The Kalman company will furnish the reinforcement including plans.

CONTRACTS AWARDED.

City of Chicago, Lake Street Bridge, 2,320 tons, to the American Bridge Co.

Merritt building, Los Angeles, Cal., 537 tons, to the Llewellyn Iron Works, Los Angeles, Cal.

Post office, San Francisco waterfront, 400 tons, reinforcing bars.

Leavitt & Johnson bank building, Waterloo, Ia., 392 tons, to the Des Moines Bridge & Iron Co.

A. M. Mull, Sacramento, Cal., auditorium building, Sacramento, Cal., 300 tons reinforcing bars.

Chicago, Milwaukee & St. Paul Ry. Co., one 140-foot through highway truss span for Rose street viaduct, North LaCrosse, Wis., 210 tons, to Chicago Bridge & Iron Co.

H. A. Voorman, apartment building, San Francisco, Cal., 200 tons to the Pacific Rolling Mill Co.

Ford Motor Co. building, Detroit, 1,500 tons, awarded McClintic-Marshall Co.

Concrete reinforcing bars for filter plant, West Side, Cleveland, 2,000 tons, awarded Carnegie Steel Co. by John F. Casey, general contractor.

City hall, Wilmington, Del., 1,500 tons, American Bridge Co. to furnish material.

Biddle street crossover, Baltimore, for Pennsylvania railroad, 235 tons. Awarded the McClintic Marshall Co.

Extension of Hamburg American Steamship Co. pier, North River, New York City, 350 tons, awarded to the Belmont Iron Works.

Section No. 2 of the Broadway-Fourth avenue subway line, New York City, 5,020 tons, the steel work awarded to the American Bridge Co. by the general contractor, the United States Realty & Improvement Co.

Steel work for East river tubes, New York City, 2,900 tons, awarded by the general contractor, Booth & Flynn, Ltd., to the American Bridge Co., which receives 1,500 tons of riveted work and to the T. A. Gillespie Co., which has given 1,400 tons of plate construction.

Canal street subway, New York City, 4,115 tons, awarded to the American Bridge Co. by the general contractor, the Underpinning & Foundation Co.

Reinforcing steel work for terminal area of New York Central railroad, New York City, 250 tons, awarded to L. F. Shoemaker & Co.

Addition to St. Mary's Hospital, Hoboken, N. J., 500 tons, awarded to Fagan Iron Works.

Highway bridge, Lawrence, Mass., 350 tons, awarded McClintic-Marshall Co.

Bridge at Phoenixville, Pa., for Pennsylvania railroad, 150 tons, awarded the Phoenix Iron Works.

Bridges for Central Railroad of New Jersey, 200 tons, divided between Levering & Gerrigues and the Eastern Steel Co.

Addition to the plant of the Penobscot Chemical Fibre Co., Breakworks, Me., 200 tons, awarded the Boston Bridge Works.

Garage for L. H. Hirsh & Co., Elizabeth, N. J., 150 tons, awarded the Hedden Iron Construction Co.

Nordheimer building, Toronto, 500 tons, awarded the Dominion Bridge Co.

CONTRACTS PENDING.

The Federal Foundry Co., Indianapolis, foundry building 300 tons.

Canadian John Parker Co., Toronto, general contractor, taking sub-bids on 1,400 tons steel, for new Hamilton Hotel, Hamilton, Ont.

State of New York, Highway department, bids in June 18, 450 tons steel, Normanskill, N. Y., viaduct.

Onondaga Hotel addition, Syracuse, N. Y., the Amsterdam Building Co., New York, general contract; taking sub-bids on steel, 900 tons.

Addition to plant of Pennsylvania Sugar Refining Co., Philadelphia, 1,200 to 1,400 tons, original drawings recalled and revised plans being issued.

William Penn hotel, Pittsburgh, 7,000 tons. Janssen & Abbott, architects, Pittsburgh.

Addition to Fort Pitt hotel, Pittsburgh, 800 tons.

Miscellaneous plates for caissons, Panama canal, 2,400 tons.

Addition to the Bonwit, Teller Co. store, New York City, 2,100 tons, Post & McCord, low bidder on general contract, which indicates the steel will go to the American Bridge Co.

Cheseborough building, State and Whitehall streets, New York City, general contract awarded to the Thompson-Starrett Construction Co. Steel requirements reduced to 900 tons.

Loft building for Authentic Realty Co., Long Island City, 650 tons, bids being taken.

Section No. 7 of the Lexington avenue subway line, New York City, 3,860 tons, the Rapid Transit Subway Construction Co. low bidder on the general contract.

The United States government has approved plans for a concrete dock wall on the Monongahela river, extending 1,000 feet along property owned by the Jones & Laughlin Steel Co., Pittsburgh.

(*For complete prices see page* 1108)

St. Paul Orders Rails

And Will Soon Close For Another Tonnage— Car Orders Expected From Canada

New York, June 17. (By wire.)—The St. Paul has released 15,000 tons of rails on an old order to the Illinois Steel Co. and is closing for 15,000 tons additional. The Pennsylvania has given the Cambria Steel Co. another test lot of 5,000 tons, making its total season purchase to date 25,000 tons. The Lorain Steel Co. has 5,000 tons of girders from the New South Wales government. The Canadian Northern gives 45,000 tons to the Dominion Iron & Steel Co.

The Canadian parliament guarantees the $16,000,000 loan of the Grand Trunk Pacific, which is expected to place car orders soon. The Toledo & Ohio Central is figuring on 2,000 cars.

Car orders of the week reach about 1,000, the principal lot included being 750 coal cars for the Pittsburgh, Shawmut & Northern, which was taken by the American Car & Foundry Co. There is considerable figuring on steel underframes, though some of it is in tentative form. The Kansas City Southern is considering 1,000 underframes, the Northern Pacific 750, the Chicago Junction railways 500 and the Rock Island 100. Pending car inquiries at present total about 2,500.

Rail Orders Light

There is a little activity in rails. The Baltimore & Ohio railroad has placed a small order with the Maryland Steel Co., and the St. Paul is placing some additional orders. The St. Louis & San Francisco, which was reported last week as awarding 9,000 tons to the Tennessee Coal, Iron & Railroad Co., is still in the market, as its original inquiry was for 30,000 tons.

In the Cleveland district there is a little bit more activity on the part of the railroads and some orders for track fastenings have been placed. The Standard Steel Car Co. has taken an order for 10 steel cars for the Consolidated Gas & Electric Co., Youngstown.

Western Penn Rail Mills Doing Better

Manufacturers of standard steel rails in western Pennsylvania report demand the first 13 days of this month considerably in excess of that in the corresponding period in May. New buying continues light. There is no change in the situation for spikes or other track fastenings.

Track Fastenings Active

Considerably increased demand for railway track accessories is evident in Chicago and orders for tie plates, bolts and spikes have been coming in recently with much more vigor than usual. Railroads appear to be taking up betterment work along this line and the demand for this class of goods appears to be increasing steadily.

CAR AND LOCOMOTIVE ORDERS.

The Pittsburgh, Shawmut & Northern railroad has ordered 750 coal cars from the American Car & Foundry Co.

The Atlantic Coast Line has ordered 100 logging cars from the Cambria Steel Co.

The Chicago, Milwaukee & St. Paul railroad has ordered 10 coaches from the Standard Steel Car Co. and 19 mixed types of passenger equipment, from the Barney & Smith Car Co.

The Delaware, Lackawanna & Western railroad is asking prices on 55 suburban passenger cars and 200 mine cars, in addition to 500 box cars and 200 automobile cars, previously reported.

The Chicago, Milwaukee & St. Paul railroad is in the market for 200 tank cars.

Warehouse Business Improves

The improvement noted in demand for warehouse products immediately after the settlement of the brickmakers' strike continues and warehousemen in Chicago find the volume of trading considerably higher than has ruled earlier this year. Building operations held up previously are being taken up with a rush and material is wanted as quickly as warehouses can furnish it. Other factors in the trade have been more than fair in the first half of the year

Better at Cincinnati

At Cincinnati warehouse business is a little heavier, demand being mostly for structurals and building materials. Orders are about evenly divided among buyers in and outside of the city. Prices are unchanged and in some cases are reported a little stronger. The threatened decline in quotation of several weeks ago has about disappeared.

Improvement at New York

New York jobbers continue to note an improvement in the demand for store and their business, to date, is considerably ahead of May. Some interests state their gain is fully one-third, but this rate of increase is larger than the general run. New York store prices are unchanged.

(*For complete prices see page* 1108)

METAL MARKETS

New York

June 16.

Copper.—The refined copper market, because of a lack of sustained buying, continues to reflect a weakness in tone, and although the producers' price on electrolytic is supposed to be 14c, delivered 30 days, this figure can be shaded with ease. Sales are heard of at as low a price as 13.87½c, delivered 30 days. On a wholesale contract basis, we quote electrolytic at 13.65c to 13.75c, cash. Prime casting, we quote at 13.60c to 13.65c, cash. Prime lake now is available at 14c to 14.12½c, cash. The London market today is at the lowest level of the year, £61 10s for spot and £62 2s 6d for three months.

Tin.—The continued decline in the price on the London exchange and in this market has caused both buyers and sellers to be shy. Sales are reported to involve only small lots here and there to meet current needs. We quote spot, June and July at 30.12½c, while each succeeding month is held ⅛c higher. Today's London close was £136 5s on spot, the lowest since 1909. Three months today closed at £138.

Lead.—Domestic consumers continue to buy only enough for current requirements. The demand from abroad, however, continues good, most of this business being booked by the American Smelting & Refining Co. The price continues firm at 3.90c, New York, and several independent producers are willing to sell for a few months ahead at this figure.

Spelter.—There is very little demand, but as producers are not exerting any selling pressure the market does not display any weakness at present. Prime western brands are quoted at 5.05c to 5.10c, New York.

Antimony.—Prices are weak and nominal because of lack of demand. We quote, duty paid, New York, on large lots, as follows: Cookson's, 7.12½c to 7.25c; Hallett's and United States 6.80c to 6.90c; other brands 5.65c to 5.75c.

Chicago

June 16.

Small transactions and comparatively few continue to mark the metals market in this district and prices are little changed from last week. Pig tin is a shade higher but others remain approximately at the same level.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Lake copper, carload lots, 14.00c; casting, 14.00c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 5.05c; lead, desilverized, 3.08c; sheet zinc, $7.00, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 31.50c; Cookson's antimony, 7.25c; other grades, 5.75c.

Little trading is being done in old metals and only most urgent needs are being filled while users are delaying purchases wherever possible. Accumulations of almost all items in the hands of dealers are large but there is no tendency on the part of holders to push their stocks as prices will not bear the pressure of efforts to sell.

We quote dealers' selling prices f. o. b., Chicago, as follows:

Copper wire, crucible shapes, 12.75c; copper bottoms, 12.00c; heavy red brass, 11.75c; heavy yellow brass, 9.00c; No. 1 red brass borings, 10.50c; No. 1 yellow brass borings, 8.00c; brass clippings, 9.25c; lead pipe, 3.60c; zinc scrap, 4.00c; tea lead, 3.50c; No. 1 aluminum, 14.00c; No. 1 pewter, 22.50c; block tin pipe, 30.50c; tin foil, 27.00c; linotype dross, 3c; electrotype dross, 3c; stereotype plates, 4.25c; stereotype dross, 3c.

Low Prices

Made in Boiler Tubes—Fair Inquiry for Pipe

Very active competition has developed in boiler tubes and 74, 5 and 5 off list is being quoted in some cases on base size, 3½ to 4½ inches. This is about 13 cents per foot and is considered a very low price, probably as low as the trade has ever known considering the increased cost of production, although boiler tubes from 3½ to 4½ inches have been as low as 10 cents per foot.

Oil and Gas Interests Taking Pipe

Manufacturers of line pipe and oil country goods continue to receive fairly heavy inquiry, but no large orders have been placed recently. Some mills have received an inquiry for about 500 miles of pipe, ranging from 4 to 24 inches in diameter, for shipment to Holland, but it is believed the German mills will furnish all sizes below 10 inches in diameter. Some of the mills have increased operations slightly. Demand for boiler tubes continues light.

Tube Segments

Still Pending in New York—May Be Placed Any Day

Reports printed in New York City, that the 80,000 tons of cast iron segments for the East river tubes had been awarded to the Davies & Thomas Foundry Co., Catasauqua, Pa., and to the Wheeling Mold & Foundry Co., Wheeling, W. Va., are officially denied. The contract, however, may be placed any day and it is possible the companies named may participate in the award, as it is expected the tonnage will be divided among several shops. Buying of cast iron pipe in the eastern districts has been better the past week or 10 days, both municipalities and private buyers figuring more freely. Bids went in this week on 1,200 tons of 6 to 20-inch, for Albany, and will be taken June 19 on 2,100 tons of 8, 20 and 24-inch pipe by the Metropolitan Water Board of Boston. Syracuse, N. Y., is out for 400 tons of 12 to 24-inch iron culverts; Milltown, N. J., for 500 to 600 tons of pipe on a contractors' letting, and Bellville, N. J., on 200 tons of 6 and 12-inch, to close June 13. Perth Amboy has placed 2,500 tons of 30-inch, most of which went to R. D. Wood & Co. Prices in the eastern market remain soft.

Cast Pipe Market Slack

Sellers of cast iron pipe in the Chicago district find business decidedly slow, outside of routine orders from contractors. The United States Cast Iron Pipe & Foundry Co. has taken 400 tons for high pressure work at Detroit. Holland, Mich., opens bids this week on 200 tons and Columbus, O., on 500 tons.

The long deferred project at Highland Park, Mich., now appears to be near a settlement and a plan has been worked out for using concrete pipe, wood pipe and cast iron pipe for various sections of the line. No award has been made on any part of the work.

Activity in Cooper Engines

The C. & G. Cooper Co., Mt. Vernon, O., report considerable activity in its gas and steam engine departments. It is shipping to the Columbia Gas & Electric Co.'s Branchland, W. Va. pumping station two compressor units. These consist of 21½ x 36-inch single tandem Cooper gas engines, direct driving 15½ x 36-inch Ingersoll-Rand hurricane type compressor cylinders. These two units will deliver about 14,600,000 cubic feet of free gas per 24 hours against a pressure of 275 pounds.

The company is building for the Logan Natural Gas & Fuel Co. a 24 x 48 twin tandem compressor unit, which will also drive Ingersoll-Rand hurricane type compressor cylinders. This unit will be installed at the Pavonia, O., pumping station of the Logan company. The Altoona Portland Cement Co., Altoona, Kas., has ordered a 21 x 30 single tandem Cooper gas engine, to be direct connected to an alternating current generator. This machine is to operate in parallel with other gas engine units.

The Marshall Field Estate has just placed an order with the Cooper company for three Corliss steam engines. These are to furnish light and power for the Conway building, which is being constructed in the loop district in Chicago. This order covers one 16 x 36 simple Corliss engine direct current to a 200-kilowatt generator, one 24 x 42 direct current to a 400-kilowatt generator, and one 24 x 40 x 42 cross compound non-condensing Corliss engine direct current to a 600-kilowatt generator.

Nuts, Bolts and Rivets

Demand for nuts, bolts and rivets is light, and plants are not operating much beyond 40 or 50 per cent of capacity. Nuts and bolts are selling at rather wide ranges in price, and the same holds true with reference to structural and boiler rivets. Specifications are not coming out in satisfactory volume.

(*For complete prices see page* 1108)

Obituaries

J. H. S. Stimmell, a well-known authority on coke, and secretary and treasurer of the Courier Co., Connellsville, Pa., publishing *The Connellsville Daily Courier*, died last Thursday at Confluence, Pa., of heat prostration.

Thomas J. Skelley, aged 51, 916 East 147th street, Cleveland, president of the H-S Metal Specialty Co., and the Skelley Bracket Co., died, Sunday night, at his office, 708 Vincent avenue, where he had gone to attend to correspondence. Heat is thought to be indirectly responsible.

John F. Robinson, assistant secretary of the American Car & Foundry Co., died at his home, 5559 Vernon avenue, St. Louis, Sunday, June 14, following an illness of two months. He was 38 years old and had been associated with the car and foundry company for 15 years.

John Martin Frederick, 75 years old, a veteran Carnegie employe, died last week at his home in Braddock, Pa. He was employed at the Edgar Thomson works of the Carnegie Steel Co., at Braddock, where he served as a mill foreman many years. His first experience was obtained in the plants of the old Cambria Iron Co., Johnstown, Pa.

John Donald MacKinnon, who was one of the organizers of the Variety Iron Works, Cleveland, and of the MacKinnon Boiler & Machine Co., Bay City, Mich., died June 4. Mr. MacKinnon was born in Cape Breton, Nova Scotia, March 17, 1841. In 1866, he was one of the organizers of the Variety Iron Works, and in the following year sold out his Cleveland interests and moved to Bay City, Mich., where he erected a boiler shop and started in business under the firm name of MacKinnon & Bestor. The business became the Bay City Steam Boiler Works in 1869 with Mr. MacKinnon as proprietor. In 1883, a machine shop, foundry, pattern shop, blacksmith shop and drafting department were added and the name was changed to the MacKinnon Mfg. Co. In 1902, Mr. MacKinnon sold out his business interests to his sons, Hector D. and Arthur C. MacKinnon, and the name of the concern was changed to the MacKinnon Boiler & Machine Co. Since 1903, Mr. and Mrs. MacKinnon had resided at Ocean Park, Cal. At both Bay City and Ocean Park, he took a very active interest in public affairs. He held several municipal offices.

The rolling mill of the Ulster Iron Co., Dover, N. J., has been closed for the summer months, thus throwing out of employment some 350 or 400 men.

Want Engineers to Help

Speakers at Spring Meeting of A. S. M. E. Ask Aid in Solving Modern Problems

St. Paul, Minn., June 16. (By wire.)—With an unusually large attendance from the northwestern states and a plentiful representation from the east, the annual spring meeting of the American Society of Mechanical Engineers opened Tuesday evening at St. Paul with introductory remarks by Max Toltz, chairman of the local committee. An address of welcome was made by Gov. A. O. Eberhardt, of Minnesota.

Speaking in behalf of the St. Paul reception committee, Paul Doty, vice president and general manager of the St. Paul Gas Light Co., stated that to the engineer will fall the duty of protecting property values in an age when destruction of property and assaults on corporations are popular. Elaborating on this theme, H. L. Gantt, vice president of the society, pointed out the necessity for engineers to assume more prominent positions in public life in order that through their efforts people may be taught the true bearing of present economic problems. People must learn to be guided by facts, not by opinions, said Mr. Gantt, and the absence of engineers in such bodies as the congressional commission investigating the relations between labor and capital, is deplorable.

At the first professional session at the St. Paul hotel, Wednesday morning, a group of papers were presented on the subject of powdered fuel, covering particularly the use of powdered coal in the cement industry, in forge shop furnaces and for the generation of steam.

A series of five papers on miscellaneous subjects were read Wednesday afternoon, including an interesting summary of results of social service work by students in certain eastern engineering schools. These students taught immigrant laborers in night classes, thus becoming familiar with the labor problem by personal contact.

Will Sell Gas Engines

The Traylor Engineering & Mfg. Co., Allentown, Pa., has completed arrangements with Chas. A. Jacobson for the manufacture and sale of the Jacobson type of gas engines. Mr. Jacobson will devote his entire time to the designing, building and sale of these engines and will have the assistance in this work of the engineers of the Traylor company. The engine is of the scavenging type and will operate on natural, producer or illuminating gas. The engines are built with single and multiple cylinders and are adapted for direct-connection to alternators operating in parallel. The engines are built in all sizes.

Scrap Shipments

To Foreign Countries Discussed by Association

New York, June 16.—Serious discussion in regard to the problems which confront old metal dealers in making scrap shipments abroad was a feature of the meeting of the metal section of the National Association of Waste Material Dealers, which held its regular quarterly meeting at the Hotel Astor, this city, yesterday and today. A good many complaints were heard to the effect that shipments of old metal do not reach their destinations intact, and frequently the shipper in this country receives a claim from the buyer abroad, arising from a shortage in weight. Losses of this nature have been a source of considerable annoyance to old metal dealers in this country and those who were represented at the meeting were of the opinion that the only way of solving the problem is to have the steamship company which transports the goods become responsible for any losses which occur in shipment. For taking this matter up with the steamship companies, a special committee was appointed, being composed of the following: Geo. Harris, Boston; N. London, of New York; H. Lissberger, New York; Harry K. Ford, Philadelphia; and B. Levy, Berlin. Mr. Levy will take up with the steamship companies the European end of this matter.

The traffic committee reported that it had taken up with several railroads the question of getting lower freight rates on scrap metals, but had received no encouragement. The traffic committee also reported that it is making efforts to secure lower ocean freight rates on old metals, which in some cases now are higher than the rates in effect on new metals. Efforts also are being made to effect a classification of old metals, which shall be more favorable to exporters than the present classifications.

Largest in History.—The Terry Steam Turbine Co., Hartford, Conn., recently has added a large number of machine tools which will increase the capacity of the plant approximately 25 per cent. The month of May was the largest in the history of the company in the number of orders received.

Stahler Machine Co. Organized

The Stahler Machine Co., Inc., Mt. Union, Pa., was organized for the purpose of manufacturing the Stahler high speed combined crusher and rolls, designed for the reduction of any and all rock to any desired fineness and for the manufacture of the Myers two point plow share, in connection with doing a general foundry and machine shop business in iron and brass. It will make a specialty of high grade iron castings.

Following are the names of the officers of the company: Geo. R. Reynolds, president and general manager; Frank B. McCabe, vice president; G. B. M. Kepler, secretary and treasurer; M. A. Jones, sales manager.

Mesta Orders

Include Blooming Mill and Four Blowing Engines

The Mesta Machine Co., Pittsburgh, has received an order from the Massillon Rolling Mill Co., Massillon, O., for a 34-inch, two-high reversing blooming mill and equipment, including tables, manipulator, shear, etc. The mill will be built of cast steel and will be of modern design. The contract also calls for a rope drive to be used in connection with the company's new 24-inch sheet bar mill now being installed.

The Cambria Steel Co., Johnstown, Pa., has placed an order with the Mesta Machine Co. for four horizontal cross compound blowing engines with high pressure steam cylinders 48 inches in diameter, low pressure steam cylinders 84 inches in diameter, air cylinders 84 inches in diameter with a 60-inch stroke. The engines will be equipped with Mesta automatic plate valves (Iverson patent) and will be duplicates of the engines recently furnished the Woodward Iron Co., Woodward, Ala., in record time. Orders for ten of these engines have been received within the last seven months by the Mesta company, together with orders for 26 new air heads equipped with Mesta automatic plate valves to replace valves on engines of various makes.

The Union Twist Drill Co., Athol, Mass., is breaking ground for another addition.

Serious Setback

For Westinghouse Strikers—Outlook is Hopeful

The spirit of optimism seems to prevail among the officers of the various Westinghouse companies in the Pittsburgh district in regard to the strike situation, and there is a feeling prevalent that in a short time there will be a general movement to return to work on the part of a majority of their men.

On Friday, of last week, a number of employes of the Union Switch & Signal Co. walked out at noon without presenting any reasons for so doing. The company promptly announced that the works would be shut down until Monday, at which time the employes would be expected to return. Practically the full quota of men has now returned, and this, coupled with the unsuccessful attempt of the strikers to call out the men at the Westinghouse foundries at Trafford City, has given their cause a serious setback and seems to indicate a speedy return to normal conditions.

The management states that there has not been any change in its attitude with reference to importing "strike-breakers", but so far it has devoted its energies towards safe-guarding the valuable properties placed in its charge.

When asked as to the effect of the strike on the business of the companies, one of the officers stated that owing to the policy adopted several months ago of manufacturing goods for stock in order to provide work for its employes during the dull period, a large amount of goods, sufficient in many lines for several months' requirements, had been made and distributed to the company's warehouses in various parts of the country, from which orders have been filled daily without delay.

German Firm Purchases Plant

The Stahlwerk Becker, A. G., Willich, Rhineland, Germany, which for some time has had under contemplation the location of a branch factory in this country, has purchased the plant of the Baldwin Steel Co., at Charleston, W. Va. The transaction just has been concluded by Reinhold Becker, director general of the company, who came to this country a few weeks ago, departing June 15 on the Kronprinzsessin Cecilie. The Becker company has been marketing into this country, large quantities of seamless tubes, high speed steels, spring steel, automobile steels and other special steels, its selling representative being the Becker Steel Co. of America, with offices at 90 West street, New York. The company immediately will send one of its technical directors to this country, who will at once begin to fit the Baldwin plant for its purposes. The company's plan is to ship ingots from its main plant in Willich to Charleston where they will be rolled into tool steel and high speed steel. Later on, the company plans to install machinery at Charleston, which will enable it to roll the same general line of products it now manufactures at Willich.

Many Delegates

Attend Convention of Sheet Metal Contractors

Cincinnati, June 16.—The tenth annual convention of the National Association of Sheet Metal Contractors opened at Cincinnati today and will continue throughout the week. About 600 delegates from all parts of the United States are attending the meetings and exhibitions which are being held under the auspices of the Cincinnati Sheet Metal Club. Headquarters of the convention are at the Hotel Gibson and Music Hall, the latter place being devoted to exhibitions and meetings.

The program includes some very good lectures by men prominent in the sheet metal line, among which will be one by Edwin L. Seabrook, of Philadelphia, secretary of the National Association of Sheet Metal Contractors, the subject being the "Cost of Doing Business" and "One Thing I Did Last Year That Made Me Money". June 17 will be given over to the warm air furnace committee, upon which day addresses will be given by J. D. Green and Allen Williams, the latter president and secretary of the National Warm Air Heating and Ventilating Association. June 18 will be given over to executive sessions. The convention will terminate on June 19.

Offer for Pope Properties

An offer of $1,800,000 has been made by a syndicate of bankers for all the properties of the Pope Mfg. Co., in Connecticut and Massachusetts, now in the hands of a receiver. The courts have set June 24 at Hartford as the date for a hearing upon the matter. Col. Geo. Pope, the receiver, recommends acceptance of the offer and the attorneys for the bank creditors have stated that the proposition is acceptable to their interests. The offer includes $400,000 in cash and $1,400,000 in seven-year, six per cent mortgage notes.

Good Results

Obtained With Use of Titaniferous Ores

Further success with the smelting of titaniferous iron ores, from deposits in the Adirondack regions of New York state, is reported by the managers of the McIntyre Iron Co., which is operating the Northern Iron Co.'s furnace at Port Henry, N. Y., upon such experiments. After some delays, due to shortage in ore, the tests were resumed only a few weeks ago and now are being carried forward with an increased proportion of the ore in the mixture. During February of the current year, the furnace was operated on from 1/16 to ⅛ of titaniferous ore, producing foundry iron. The silicon ranged from 1.55 to 3.05 per cent. The ore supply, however, gave out and after 10 days it was necessary to drop the use of the ore. On June 3 its use was resumed, ⅛ of the mixture being titaniferous ore containing from 13 to 14 per cent titanic acid. On June 10 the titaniferous ore was increased to 25 per cent and the furnace still is using this quantity. To date there are no indications that its use is having or will have any deleterious effects on the operation of the furnace. In fact, judging from the results of the February and June operation, the assumption of the furnace managers at the present time is that the presence of titanic acid in the furnace mixture up to the amount as now used is an advantage instead of a disadvantage.

Emery Wheel Works Expanding

The American Emery Wheel Works, Providence, R. I., recently has increased its machine shop facilities by the addition of a 16-inch by 12-foot Lodge & Shipley engine lathe and an 18 x 36-inch x 8-foot Fay & Scott extension gap engine lathe and a power press furnished by the Standard Machinery Co. Specifications also have been issued for the installation of a 1,000-ton hydraulic press complete with compressor. Work also soon will be started on a third floor addition, 55 x 100 feet in size, to be used as the main offices of the company, and the ground floor offices will be converted into additional manufacturing space. These increased manufacturing facilities are made necessary by the company's constantly growing business.

The Vermillion Malleable Iron Co., Hoopeston, Ill., is about to erect an addition, 95 x 175 feet.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

J. F. Townsend, traffic manager of The National Tube Co., Pittsburgh, Pa., has recently been added to the membership of The American Iron and Steel Institute. He entered the railway service in 1879. During the first ten years of his service, he was freight clerk of the Cleveland, Tuscarawas Valley & Wheeling Ry., and for a short time was with the Empire Line Transportation Co. and also served as a clerk in the accounting department of the Lake Shore & Michigan Southern Railway, and in the general freight office of the

J. F. TOWNSEND,
New member of the American Iron and Steel Institute

Cleveland, Lorain & Wheeling Railroad. From 1889 to 1893, Mr. Townsend was general traffic agent of the Cleveland, Lorain & Wheeling railway; from March 20, 1893, to Feb. 1, 1897, assistant general freight agent of the Wheeling & Lake Erie railroad; from Feb. 1, 1897, to August, 1899, assistant general freight and passenger agent; from August, 1899, to November, 1899, general freight and passenger agent of the same railroad, and from Nov. 1, 1899, to date, traffic manager of The National Tube Co. He read a paper on transportation at the recent meeting of the American Iron and Steel Institute in New York.

Fred A. Poor, Chicago representative of the Rail Joint Co., resigned on June 1 to become president of the P. & M. Co., dealers in railway specialties, whose general offices are in the Railway Exchange building.

Stanley G. Flagg Jr., of the Stanley G. Flagg Co., Philadelphia, sailed last week for an European trip.

W. L. Jack, treasurer of the Riter-Conley Mfg. Co., Pittsburgh, has resigned. His successor has not yet been named.

R. B. Wallace has resigned as general manager of the American Ship Building Co., a position which he has held since 1908.

C. R. Robinson, general manager of sales of the Lackawanna Steel Co., returned to this country on the Adriatic, after an extended tour abroad.

George P. Thomas, head of the Standard Bridge Tool Co., Pittsburgh, builder of the Thomas spacing table, expects to sail June 20 for Europe.

J. F. Billet recently was appointed general manager of the Buckeye Twist Drill Co., Alliance, O. He was formerly with the Cleveland office of the Niles-Bement-Pond Co.

H. G. Dalton, of Pickands, Mather & Co., Cleveland, has returned after an absence of six months in Egypt and different European countries. Mr. Dalton was accompanied by Mrs. Dalton.

J. G. Rohrman, formerly of the Pittsburgh office of The Youngstown Sheet & Tube Co., Youngstown, O., was on June 15 placed in charge of the district sales office which has just been opened by the company in Atlanta, Ga., at 1514 Healey building.

A. N. Flora has been named assistant general manager of the Trumbull Steel Co., Warren, O., being assistant to W. H. B. Ward, vice president and general manager. Mr. Flora went to the Trumbull company from the Gary works of the American Sheet & Tin Plate Co.

B. J. Padshah, member of the firm of Tata Sons & Co., Bombay, India, a leading figure in the affairs of the Tata Iron & Steel Co., Sakchi, India, arrived in New York, June 5, on the Aquitania, on business connected with the steel company. Mr. Padshah will return to India by way of China and Japan.

George N. Jeppson, works manager of the Norton Co., Worcester, Mass., has returned from his European business trip and reports that business throughout Europe is generally very dull, excepting for the unusual war preparation activity in Russia. Mr. Jeppson reports all government arsenals and other war material factories in Russia are working overtime.

Charles G. Stevens, recently elected member of the American Iron and Steel Institute, was western sales manager for the Wilmot & Hobbs Mfg. Co., of Bridgeport, Conn., from 1895 to 1896, and of Abbot Wheelock & Co., of 98 John street, New York, in 1897. Mr. Stevens started his

CHAS. G. STEVENS,
New member of the American Iron and Steel Institute

present business, that of Charles G. Stevens & Co., Chicago, in January, 1898, in his own name and as sole owner. The business was incorporated The Charles G. Stevens Co. in January, 1903. Mr. Stevens participated in the organization of the West Leechburg Steel Co., of Leechburg, Pa., in 1898, and in the West Penn Steel Co., Brackenridge, Pa., in 1909. The company in 1910 erected a six-story and basement brick building containing 73,000 square feet at the corner of Monroe and Jefferson streets, Chicago. In 1912 there was added an annex building, the same height and construction, containing 53,000 square feet, as a home for the corporation where its offices are located and principal stocks are carried.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

The corporation also has large warehouse facilities at Jefferson and Kinzie streets, Chicago.

A. H. Teuchter, president of the Cincinnati Bickford Tool Co., Fred A. Geier, president of the Cincinnati Milling Machine Co., Henry Dreses, of the Dreses Machine Tool Co., and E. M. Chase, of the Modern Foundry Co., all of Cincinnati, sailed on the same ship on June 16, for an extended tour of Europe.

Alex B. Hawes has resigned as manager of the Chicago office of Matthew Addy & Co., pig iron and coke, and has taken a position with Pickands, Brown & Co., succeeding Chas. L. Minor, who has resigned. John T. Rothier has succeeded Mr. Hawes in charge of Matthew Addy & Co.'s interests here.

W. A. Thomas, formerly in charge of sales of mining apparatus for the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has opened an office as a consulting engineer, in the First-Second National Bank building, Pittsburgh. He is a graduate of Pennsylvania State College and has had considerable practical experience in mining.

Theodore Hofeller, of Theodore Hofeller & Co., scrap metal, rubber and waste dealers, Buffalo, and first president of the National Association of Waste Material Dealers, is leaving with Mrs. Hofeller for a three months' trip abroad, sailing June 16 on the Kronprinzessin Cecilie. The trip will include Germany, Austria, Switzerland and France.

Alfred G. Smith was elected general manager of the American Ship Building Co., at a meeting of the board of directors, held on Wednesday, June 17. Mr. Smith served his apprenticeship in the yard of the Globe Iron Works, Cleveland, under the direction of his father, who was one of the pioneer lake ship builders and at that time superintendent of the Globe yard. He entered the Globe yard in 1886. His experience has not been wholly confined to hull construction, having served in the machinery department with Walter Miller during the construction of the Great Northern Steamship Co.'s steamers, North Land and North West. After serving in the drafting department of the Globe yard, Mr. Smith was appointed foreman of hull construction at Lorain in 1898, remaining there until 1901, when he was appointed superintendent of the Buffalo Dry Dock Co. In 1902, he was made general superintendent of the Chicago Ship Building Co., which office he held until 1908, when he resigned to go into business for himself as a naval architect. It will be seen that he has been actively associated with the construction of all types of lake vessels since boyhood.

Fred L. Baker, newly elected member of the Iron and Steel Institute, would have had a long walk if he had been born earlier, for his father walked from Lansing, Mich., to the

FRED L. BAKER,
New member of the American Iron and Steel Institute

mining camps at Colorado in 1848. He was one of the famous gold seekers of that period. The son, however, was not born until 1865. His father, Milo S. Baker, in 1863, bought a little machine shop on the "Lucky" Baldwin estate in Los Angeles. Business increased rapidly and in 1886 the concern was incorporated as the Baker Iron Works and moved to its present location, North Broadway and College streets. The plant has grown so that it now occupies seven acres for its different departments and employs over 500 men. Owing to the death of his father, in 1889, the responsibility of the management of the company fell on the shoulders of Fred L. Baker when he was only 24 years of age. He soon demonstrated that he was equal to the task. In addition to being president of the Baker Iron Works, Mr. Baker now is president of the California Iron Works, of San Diego, Cal., and is connected with a number of other important business enterprises.

C. G. Thomas has been elected president of the Western Reserve Steel Co., which recently established offices in the Stone building, at Warren, O., and made plans to erect sheet steel mills for which ground will be broken soon. Other officers chosen were: Vice president, I. A. Thomas; treasurer, C. R. Thomas; secretary, C. H. Lewis; general manager, F. J. Thomas.

Norris T. Bush of Birmingham, Ala., has been elected president of Shelby Iron Co. He is a son of the late Col. T. G. Bush who was president of the company for 20 years. Upon the death of Col. Bush, Ward W. Jacobs, a banker of Hartford, Conn., vice president at that time, succeeded to the presidency and has been in charge of the Shelby company operations ever since. The younger Mr. Bush is a graduate of Vanderbilt university. After leaving college, he took up furnace work at the plant of what was then the Alabama Consolidated Coal & Iron Co. at its Ironaton furnace in Talladega county. Later he was placed in charge as superintendent of the Gadsden furnaces of this company for several years. He left this position to assume the position of general superintendent of the Woodward Iron Co., which he has held for several years. The Shelby Iron Co. is the oldest active iron producing company in the state of Alabama. The plant is located at Shelby, Shelby county, and furnace operations were first started there in 1846 with the old style rock furnace. Being the pioneer in the manufacture of Alabama pig iron, a great deal of the output of this company was used by the Confederate government during the civil war for making canon and shell at the Selma arsenals of the confederacy.

Mach & Revelle, Inc., manufacturers' agents, New York City, have been appointed export and eastern representatives of the American Portable House Co., Seattle, Wash. This company manufactures a complete line of portable dwellings, cottages, cabins, voting booths, tool houses, etc.

Rights of Plant Lines

Will be Determined by the Supreme Court of the United States

Washington, June 16.—Announcement has been made by the Interstate Commerce Commission that it has determined to enter an order in the industrial railways case. The order is under preparation and its entry is expected at any time.

This is taken to mean that the case will ultimately reach the Supreme Court of the United States upon which will rest the matter of determining whether these steel plant lines are mere plant facilities, as called by the commission, or whether they are common carriers, as some of them have been denominated by several state commissions.

In its statement the commission said it had determined upon its plan to enter an order by reason of a petition requesting that that course be followed, "and in view of the tap line decision of the Supreme Court the commission felt it advisable to enter an order so that a judicial determination of the questions may be made as early as practicable. The principles involved in these two cases are somewhat similar".

Predictions that the commission would be forced to this action as a result of the Supreme Court decision in the tap line case have been fulfilled at an earlier date than expected.

To the trunk lines, which cancelled joint rates and through routes with the steel plant lines, will be given the task of proving that the industrial roads are not common carriers. Failing in this, they will be compelled to restore original agreements and do away with their cancellation tariffs, which became effective April 1.

Industrial Railroad Purchased

Control of the Crane railroad, an industrial railroad in Catasauqua, Pa., the stock of which has been owned by the Empire Steel & Iron Co., has been purchased by the Lehigh & New England railroad, subject to the ratification of the Public Utilities Commission of Pennsylvania, which will consider the matter June 18. The Crane railroad has been serving a number of industries in Catasauqua, including the Bryden Horse Shoe Co., the Catasauqua Casting Co., the Davies & Thomas Foundry Co., the Crane Iron Works, and others, and it has supplied a connection with the New Jersey Central, Lehigh Valley and Reading systems. The Lehigh & New England railroad has built a branch line from a point near Bath, Pa., on its main line, to Catasauqua, a distance of five miles, and now will have an entrance to the town by way of the Crane railroad. This connection gives a more direct line between Catasauqua and New England, and will represent the fruition of plans originated years ago by A. A. McLeod, former president of the Reading system, for the shipment of anthracite coal from eastern Pennsylvania to New England, by the more direct route of the Lehigh & New England railroad and what is known as the Poughkeepsie bridge over the Hudson.

Improvements

In Finished Lines—Export Market More Active

New York, June 17. (By wire.)—The improvement in finished lines which began early this month continues and June is making a considerably better record than May. The United States Steel Corporation last week ran 65 per cent of its capacity and bookings are still slightly more than 5,000 tons daily better than in May.

Orders for plates and shapes are better with the larger mills. Considerable buying of bars is under way, but the great bulk of the implement business is yet to be placed. Tubes are active. New business in wire is better, but specifications are not quite so good. There is a good demand for sheets, though prices are poor. Structural inquiry is lighter. The export market is reported improved and foreign mills have advanced bars.

"Nipper" Anderson Again Convicted

"Nipper" Anderson, one of the union labor agitators who has been out on bail for a number of months after having been convicted at Indianapolis on the charge of transporting dynamite, has just been convicted in the municipal court of Cleveland on a charge of assault and battery committed on May 4 upon a non-union man, who was employed in the erection of the Stillman building in that city.

The strike against the Stillman building was declared by the structural ironworkers who claimed the right of building temporary bars on the concrete structure. Anderson and others attempted to prevent the non-union men from doing the work.

Will Sell at Auction

On Saturday, June 27, at 1 p. m., there will be sold at public auction all the property of the Nittany Iron Co. The sale is to take place at the courthouse at Bellefonte, Pa. At 2:30 the same afternoon, an auction sale will be held to dispose of the property of the Nittany Valley railroad, consisting of six miles of track, one locomotive, one hand car, track, cars, tools. etc. The Commonwealth Trust Co., Harrisburg, Pa., is in charge of the sale, while Barnes & Lofland, Philadelphia, will be the auctioneers.

Buys Relaying Steel Rails

The National Steel Rail Co., St. Louis, through its head, I. H. Cohn, has just purchased from the Chicago & Alton Railroad Co., 70 track miles of 60, 70 and 80-pound section relaying steel T rails. The purchase was a cash transaction. It is understood part of the rails are sold to an interurban line in the southwest.

Will Build Fertilizer Plant

Birmingham, Ala., June 15.—Officials of the Tennessee, Coal, Iron & Railroad Co. announce that a large by-product fertilizer plant to cost perhaps a half million dollars will be erected. The plant will manufacture basic slag fertilizer and is to be located near No. 3 mines of the company.

Armor Plate "Rider" Adopted

Washington, June 16.—The amendment reinserted in the naval appropriation bill by the senate providing for the appointment of a committee to seek a site for the cost of an armor plate plant has been agreed to in conference.

The Continental Can Co., Ltd., has applied to the New York stock exchange to list $5,500,000 7 per cent cumulative preferred stock and $8,000,000 common stock.

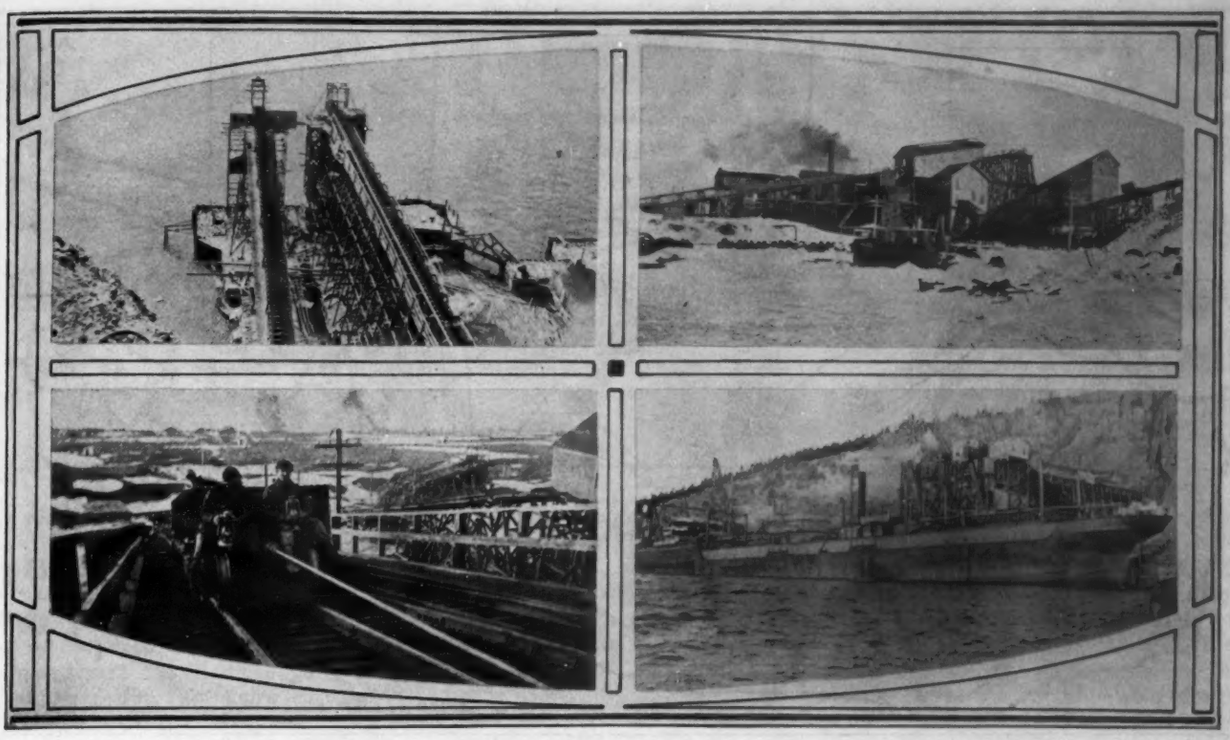


Fig. 1—Shipping Pier, Showing Endless Conveyors
Fig. 3—Steel Dump Cars on Incline Between Storage Pockets in Mine and Deckhead

Fig. 2—New Submarine Deckhead
Fig. 4—Vessels Being Loaded at the Shipping Pier

Wabana Iron Mining Operations

How One of the Largest Iron Ore Reserves in North America, Lying Largely Under the Sea, is Being Mined and Shipped

BY C J STARK

FOR more than 15 years the iron ore deposits of Newfoundland lying largely under the sea, have served as an important source of supply for manufacturers of pig iron in territory close to the eastern seaboard of the United States. The geographical location of these blast furnaces, with reference to the principal domestic ore bodies, has necessitated the annual importation of large quantities of mineral from foreign countries in order to obtain economical mixtures. Since the Newfoundland ore resources first were exploited in a commercial scale in 1895, more than 1,800,000 tons of this material have been shipped to this country, and practically all of it has been consumed by furnaces in eastern Pennsylvania and New Jersey. More than 1,000,000 tons of this ore were imported during the past five years. The heaviest shipments were in 1910, when 220,836 tons were received; in 1913 the imports amounted to 204,823 tons.

Probably no outlying source of developed ore supply now being drawn upon by the furnaces of this country represents so large a potential reserve as that of the Newfoundland deposits. In exhibits recently put in evidence in the suit of the United States government against the United States Steel Corporation, it was estimated by experts that one-third of the 10,000,000,000 tons of known iron ore in North America, available for commercial requirements, is in Newfoundland. In fact, that island is credited with a larger actual reserve than the Lake Superior regions of the United States.

Wabana Deposits Contain 1,000,000,000 *Tons*

Practically all the Newfoundland ore is embraced in deposits upon which the Wabana mines of the Nova Scotia Steel & Coal Co. and of the Dominion Iron & Steel Co. are now operating. It is estimated that the Wabana deposit contains from one to two billion tons of recoverable ore of good quality which can be mined to economical advantage. Only a small portion of this deposit is on land; the great bulk of it extends under the sea. The ore is a dense red hematite, analyzing 51 to 53 per cent in metallic iron, 10 to 11 per cent in silica and 0.85 per cent in phosphorus, with practically no sulphur. The regularity of the ore-bearing measures is remarkable and very similar to those found associated with coal seams. This enables calculations to be made with a degree of reliability seldom obtained in metal mining.

Bell Island, the site of the Wabana mines, is situated in Conception Bay, the most southerly bay on the eastern coast of Newfoundland. The island is of small area. It is about six miles long by two miles wide and is elliptical in shape as its name signifies. The outcrops on the island represent the visible evidence of the great beds of ore that extend under the water of the surrounding bay.

The deposit first was discovered

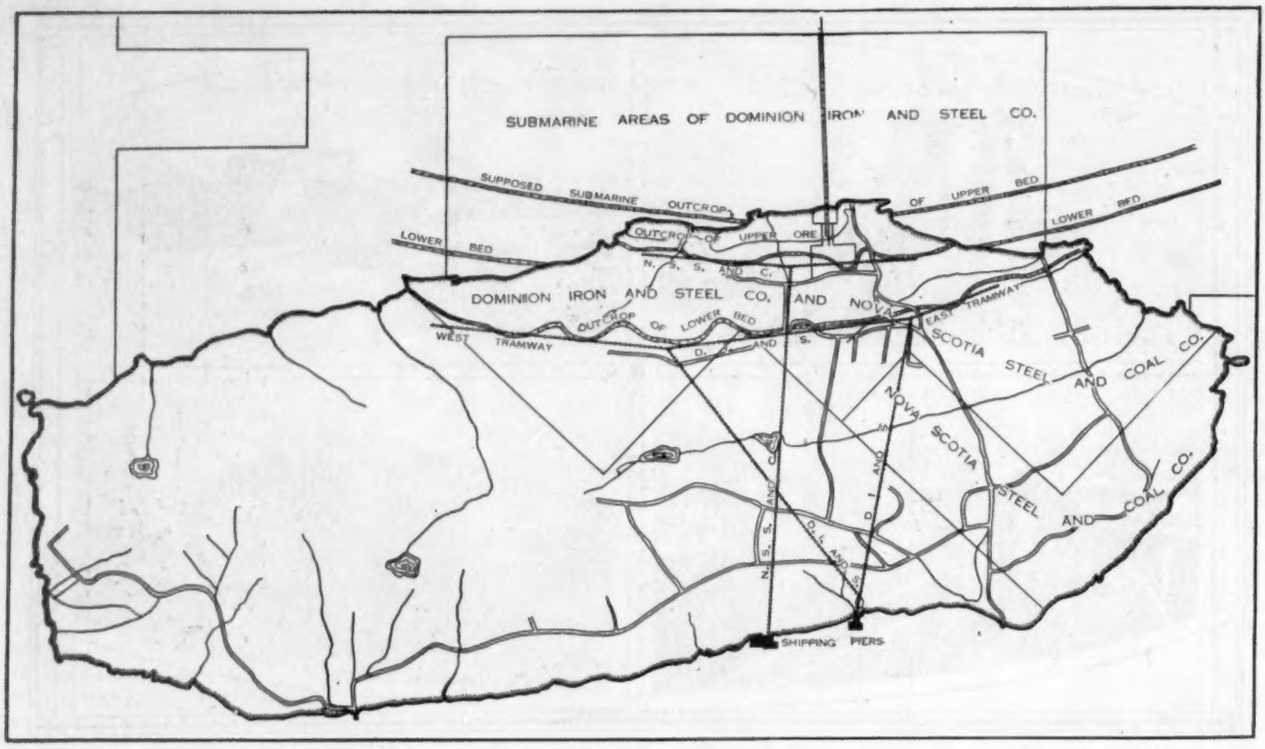


FIG. 5—PLAN OF WABANA, SHOWING SURFACE DEVELOPMENTS AND PART OF THE SUBMARINE AREAS

where the beds outcrop in the cliff, but the value of the mineral was not appreciated until 1893, when the property was acquired by the Nova Scotia Steel & Coal Co., a Canadian company. This concern commenced active operations at once and in 1895 the first shipment of ore was made to the company's furnaces in Nova Scotia. These operations have been continued ever since. In 1899 a portion of the areas first taken up was sold to the Dominion Iron & Steel Co., then being formed with headquarters at Sydney, in Cape Breton, Nova Scotia. At this time the value of the submarine areas was not fully realized, but later both companies added to their holdings in that direction. Today the Nova Scotia company controls some 45 square miles and the Dominion company 10 square miles of holdings within the confines of the ore basin.

Of the ore beds which outcrop on Bell Island, only three have been worked to any extent. Of these, only two contain any large amount of recoverable ore on land and are 7 and 14 feet in thickness. The third bed is 4 feet in thickness. All three beds are continued in the submarine areas and extend under the sea.

FIG. 6—COMPLETE SHIPPING PIER FROM THE CLIFF

The geological structure of the surrounding country indicates that the ore beds and their associated rocks occur in a vast closed, synclinal trough or basin. The center of this trough is to the north of Bell Island, two or three miles from the dip of the point on the shores, where the beds pass under the sea. The former existence of this trough is indicated by the presence of many fringes of the basic members of the iron bearing series stretching along the shore of the bay, or by outlying patches resting unconformably upon the older Huronian series which form the headlands on either side. On the south side a fringe of about one mile in width extends along the shore a distance of about 10 miles, facing the water and dipping towards it. On the north side, and to the west, about the head of the bay, isolated patches of similar rocks are met on several of the outer points and headlands, dipping in every case toward the waters of the bay. Thus Bell Island occupies the highest pillar of this trough now visible above water, but the center lies out in the bay to the north. It also is apparent that the ore basin or trough is a closed one, or, at least, closed on three sides and possibly open on the east-

Ore Mined at Wabana and Its Distribution

Year.	Nova Scotia.	United States.	Germany.	United Kingdom.	Total shipments.	Total to date.
1895	2,400	.....	.....	.....	2,400	2,400
1896	15,545	20,355	.....	.....	35,900	38,300
1897	10,842	29,499	2,523	2,523	45,387	83,687
1898	30,913	.....	63,468	6,746	101,127	184,814
1899	23,492	87,933	173,760	17,599	302,784	487,598
1900	161,911	137,381	.....	13,193	312,485	800,083
1901	411,891	75,261	189,957	52,206	729,325	1,529,408
1902	346,184	86,341	207,923	96,917	737,365	2,266,773
1903	263,784	80,992	173,339	62,069	580,184	2,846,959
1904	426,759	5,380	119,624	34,767	586,530	3,433,489
1905	461,066	5,795	218,868	4,241	689,970	4,123,459
1906	565,721	126,655	124,757	61,629	878,762	5,022,221
1907	605,163	110,689	85,331	63,842	865,025	5,867,246
1908	632,255	53,154	142,111	36,490	864,010	6,731,256
1909	628,313	215,364	91,542	61,781	997,000	7,728,256
1910	759,216	220,836	138,306	43,415	1,161,773	8,890,029
1911	660,960	184,994	129,508	82,107	1,057,569	9,947,598
1912	779,352	171,231	152,282	11,712	1,114,577	11,062,175
1913	1,013,745	204,823	185,950	106,984	1,511,502	12,573,677
Totals	7,799,512	1,816,683	2,199,249	758,221		

ern end toward the ocean. The outlines of the trough are shown in Fig. 7.

Further detailed geographical studies have strengthened this hypothesis and the development in actual mining has confirmed the findings to date. It is interesting to know in this connection that the beds have been worked with no deterioration in total thickness or quality for over two miles on the dip and over the outcrop extending three miles in length. Over a mile and a half of slope, driven on the dip of these two miles was under the waters of Conception bay.

Mining Pushed Vigorously

The development of the Newfoundland ore beds has been pushed on a vigorous scale in recent years and a mining plant adapted to the peculiar requirements of the property has been so enlarged and extended that today more than a million and a half tons of output is being obtained annually under modern and economical conditions.

Mining now is being carried on simultaneously upon the land and submarine areas. On the land areas the ore with cover not exceeding 15 feet is stripped and extracted by ordinary quarrying methods. When the cover is greater, underground mining is resorted to and the ore attacked at different points, where slopes are sunk one-half mile apart along the outcrop. The surface equipment at these points consists of a deckhead where the ore is passed through a crusher, picked and screened.

The submarine areas are mined by the extension of the slopes of the land mines and in a very similar manner. The method of mining employed is given the room-and-pillar-system. Fig. 8 shows a small hammer rock-drill in operation on one of the mining faces in the submarine area. The submarine areas of the Nova Scotia Steel & Coal Co. are located 4,000 feet from the shore and have been reached by driving a slope 7 x 15 feet, which, with approaches, is 8,000 feet in length.

Handling 2,000 Tons of Ore Daily

In order to attain the desired output of 2,000 tons per working day, it is essential that the ore be handled with great rapidity. To meet this necessity, large additions and improvements have been made to the underground and surface-equipment. The most important of these is an extensive storage pocket system in the mine and a somewhat unusual type of deckhead. A view of this deckhead is shown in Fig. 2. The floor of the deckhead has been built upon an angle of 20 degrees, so that the loaded cars, as they come from the mine, do not come to rest on a horizontal landing as is the usual practice, but dump while on an incline. The two steel-bottom dump cars of 20 tons capacity each, are used to carry the ore from the storage pockets in the bottom of the mine to the deckhead. These cars are of 3-foot gage and run in balance, one coming up while the other is going down. They are hauled by a rope 1⅛ inches in diameter and 8,000 feet in length. The cars empty their contents automatically. One of these cars in operation is shown in Fig. 3. The hoisting is done by a large first-

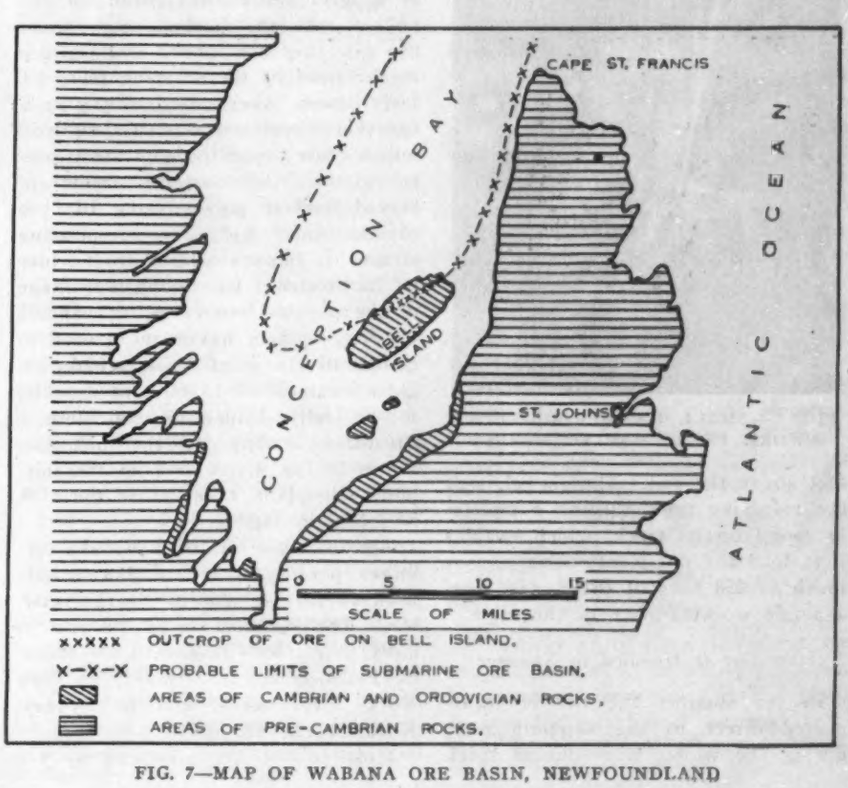


FIG. 7—MAP OF WABANA ORE BASIN, NEWFOUNDLAND

motion duplex, steam, hoisting engine. This engine is equipped with overwind and automatic braking devices. The cars are filled in the mines from bins which in turn are supplied by small 2-ton mine cars. Fig. 9 shows a mine car standing on one of the levels of the submarine areas. Drilling in the mine is carried on by compressed air, supplied from electrically-driven compressors near the mine bottom. Drills at work on the mining face are shown in Fig. 8. All other mechanical operations, such as haulage, pumping, etc., are carried on with electricity. The alternating current for the purpose is generated at the central power house, located at the south side of the island three miles distant. It is brought into the mine at 6,600 volts and transformed to 220 volts at conveniently situated transformer stations.

The ore bed at this point is 30 feet thick. This size of the ore body, combined with a scarcity of labor, experienced each year during the shipping season, has led to the development of a steam-shovel type of loader, electrically operated. This shovel is designed to turn in a radius of 27 feet and has an overall height of 12

FIG. 8—SMALL HAMMER DRILL AT WORK IN SUBMARINE MINES

feet above the rail. The shovel is of the revolving type, turning completely round on its truck, which enables it to load and dump into mine cars as much as 250 tons of ore a day from a single working-place in the mine.

How Ore is Handled in Summer

In the summer the ore is transported direct to the shipping pier; during the winter it is put in stock piles to await the opening of navigation in the spring. A special feature of the plant is the loading pier. This is situated on the opposite side of the island from the mines, because of the better shipping facilities there

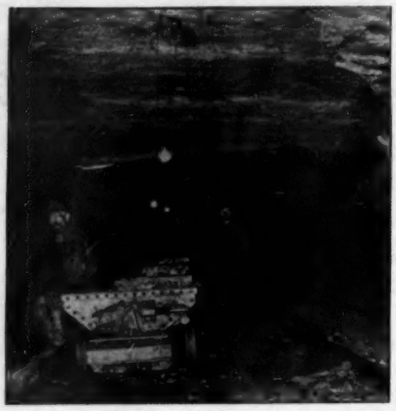


FIG. 9—SMALL 2-TON MINE CAR ON ONE OF THE SUBMARINE LEVELS

available. The handling equipment at this point consists of large storage pockets excavated from the cliff which are shown in Fig. 10. The cliff is 230 feet in height at this point. These pockets have a combined storage capacity of 70,000 tons. The ore is conveyed from the mine to the storage bins in cars of 20 tons capacity, which are similar to those used in the mine. They are drawn by an endless cable. From the bins the ore is discharged into a steel bucket conveyor, extending along the top of the pier proper at a level below the bottom of the pocket. As the buckets pass under the bin, they are loaded and proceed to the head of the shipping pier, 400 feet distant, where they turn over a sprocket wheel and deposit their load into a chute connected with the steamer's hold. A constant stream of loaded buckets passes along the top of the pier and a corresponding stream of empties returns to the bins to be loaded. By taking advantage of the physical conditions at hand, a handling system has been secured at comparatively small cost, which enables steamers of 13,000 tons capacity to be fully loaded in four hours. Steamers loading at the pier are shown in Fig. 4. A view of the shipping pier plant, taken from the cliff, is shown in Fig. 6.

The location of the Wabana ore mines permits them to ship readily both to Europe and to North America. The distance to Rotterdam is 2,294 miles; to Glasgow, 1,899 miles; to Philadelphia, 1,242 miles; to New York, 1,110 miles, and to Sydney, Nova Scotia, 412 miles.

Most of the ore produced by the Wabana mines, as shown by the accompanying table of shipments since the property was opened, goes to the blast furnaces and steel works of the Nova Scotia Steel & Coal Co. at New Glasgow, and of the Dominion Iron & Steel Co. at Sydney. It is shown that of 12,500,000 tons of ore mined to date, over 2,000,000 tons has gone to Germany, slightly less to the United States and over 750,000 tons to the United Kingdom. The remaining 7,500,000 tons have been smelted at the Nova Scotia works.

The boiler house of a big paper company is one high story with a plank roof on steel trusses. In one corner of the room is a Dutch oven, used to burn shavings and waste chips from pulp screens. The chips are brought by conveyors to a chip bin in the roof of the boiler house and thence through a hopper bottom and a galvanized pipe, to the firing floor near the oven. A fire started in these shavings, due to a back fire from the Dutch oven, and spread rapidly up the side wall to the roof and over it, burning into the cornices of the monitors and into the side frame

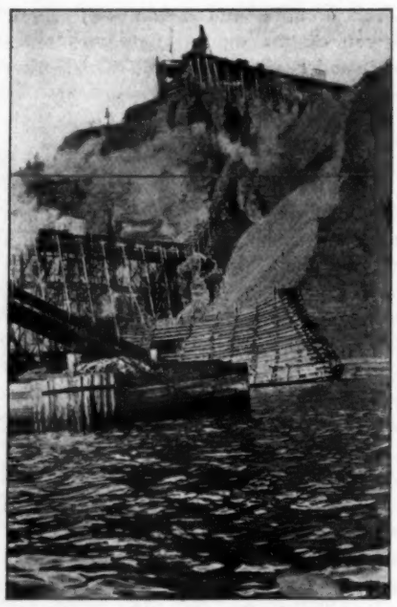


FIG. 10 — LARGE STORAGE POCKETS FOR SHIPPING ORE

of the chip bin situated on the roof.

The house was well supplied with sprinklers, which opened at once, but soon became choked by chips in the pipe which fed them. The 1,000-gallon stream fire pump also became clogged. A $3,500 loss was incurred before the fire was put out. Now a new suction pipe for the pump has been installed, which takes water from the forebay and so avoids chips.

Reclamation of Paint Rock Ores

Mesabi Range Paint Rocks Contain Up to 52 Per Cent Iron Which May Be Recovered by Sintering

BY W R VAN SLYKE

UPON EVEN A CASUAL inspection of the analyses of the various iron ores of the Lake Superior district, it is readily apparent that moisture and loss by ignition form a considerable percentage of the weight of the ore. The elimination of these non-beneficial constituents, particularly the elimination of all or part of the moisture has been considered from the time a paper on drying was read before the Lake Superior Mining Institute in 1902 by Dr. Nelson P. Hulst up to the present day which witnesses the partial elimination of moisture by drying plants at two Mesabi range mines. By moisture is understood the loss in weight by heating the ore to a temperature of 212 degrees Fahr. and maintaining that temperature until no further loss in weight is noted. By loss by ignition is understood the loss in weight by heating the sample dried at 212 degrees to a white heat and maintaining that heat until no further loss in weight is noted.

Need of Beneficiation

The writer is not intimately familiar with ores from ranges other than the Mesabi. Laboratory experiments some years ago with Mesabi ores containing high percentages of total volatile matter, both free and combined, indicated that all that was necessary to make such ores attractive from the standpoint of natural iron content was to beneficiate them by driving off the total volatile matter by some process which would leave them not dusty but with a desirable structure for the blast furnace.

Making Tests

In order to determine the suitability of the sintering process in this connection a trial shipment of some 1,500 pounds of typical Mesabi range paint rock was sent to the testing plant of the American Ore Reclamation Co. of New York City, at Birdsboro, Pa. This shipment was more to see if such material could be sintered at all than from any other consideration. Sinter of good structure and analysis was obtained.

The following table gives the result of the preliminary test of paint rock:

	Original Ore. Natural condition, per cent.	Original Ore. Dried at 212 deg. Fahr., per cent.	Sintered product dry and Natural, per cent.
Iron	40.50	49.69	54.95*
Phosphorus	0.077	0.095	0.097
Manganese	1.33	1.63	1.69
Silica	11.29	13.85	14.91
Alumina	3.47	4.26	5.28
Lime	0.29	0.36	0.17
Magnesia	0.106	0.13	0.097
Sulphur	0.018	0.023	0.046
Loss by ignition	5.835	7.16	none †
Moisture	18.50	....	none

*(52.82 per cent est.)
†(2.36 per cent inc.)

The trial shipment was followed by a shipment of about 75 tons to the same plant for a commercial test. The ore selected was taken from open pits and paint rock stockpiles and was nothing but typical Mesabi range paint rock.

As is well known the paint rocks of the Mesabi range are the result of the alteration of the slate members of the iron bearing formation, which accounts for the high percentages of silicon and alumina. They occur in abundance and form ore reserves of millions of tons. Several million tons are already in stockpile from the open pits and represent a mining charge of hundreds of thousands of dollars. The dry analysis of the bulk of them will vary from 35 to 52 per cent iron. The physical structure shows slaty characteristics, but varies from soft and greasy to hard and rocky phases. As will be inferred from the alumina content, they are generally clayey in nature and retain much water even when stockpiled for years.

In preparing the paint rock for the Dwight and Lloyd machine it was necessary to reduce it to a uniform size under ¼ inch. This was readily accomplished by passing it through a set of rolls with a 5/32-inch opening. Due to the clayey nature of the ore it was necessary to rig up permanent scrapers to the under side of the rolls. These scraped off whatever paint rock stuck to the rolls and kept them clear. The physical structure of the paint rock was so altered by crushing that there was little tendency for it to stick together again even when fairly well packed.

The paint rock was then mixed with 8 per cent by weight of anthracite coal dust by passing the coal and ore through two pug mills. From the mills it was fed directly to the sintering machine.

The analyses on the commercial test of paint rock are as follows:

	Original Ore. Natural condition, per cent.	Original Ore. Dried at 212 deg. Fahr., per cent.	Sintered product dry and Natural, per cent.
Iron	40.01	47.23	52.70*
Phosphorus	0.064	0.075	0.070
Manganese	1.45	1.71	1.83
Silica	10.85	12.81	14.36
Alumina	5.16	6.09	6.88
Lime, magnesia, sulphur,	negligible.		
Loss by ignition	7.61	8.98	none †
Moisture	15.28	....	none

*(51.89 per cent est.)
†(1.85 per cent inc.)

In the preliminary test the iron content was raised 14.45 points, and in the commercial test it was raised 12.69 points. The loss in weight and consequent saving of freight as shown by the preliminary test was 24.33 per cent, and, as indicated by the commercial test, 22.89 per cent.

Structure Changed

The structure has been changed from a clayey or slatey ore, which upon drying in the stack of a blast furnace will produce dust, to a cellular, spongy structure, easily reducible, and of benefit to the blast furnace. Due to the thinness of the cell walls of the sinter, it is more friable than natural ores, but by the use of more fuel in sintering, the cell walls can be greatly strengthened. This thinness of cell walls is a factor for easy reductibility.

How much does it cost to sinter paint rocks and other high total volatile ores? This question cannot be answered exactly until there is a plant established on the Mesabi range for the commercial treatment of these ores. But from a careful estimate based on practice in plants sintering flue dust, the figures given in Table I have been compiled, based on Mesabi range conditions. The various cost factors involved in the production of a ton of sinter are summarized in Table II.

Cost of Sintering

Naturally all of the cost factors are subject to correction as they cannot be accurately determined until a plant is actually established for the treatment of these ores. But the figures

Table I

FIRST COST AND OPERATING EXPENSE OF SINTERING PLANT

Estimated cost of plant:—Containing 2 Standard Dwight and Lloyd machines with wooden buildings and bins, exclusive of railroad tracks and trestle		$40,000.00
Estimated Operating Cost per day of 24 Hours:—		
Output of 2 Standard D. & L. machines, 200 gross tons of sintered product per day of 24 hours, when treating ore finer than ¼ inch. Cost does not include crushing of ore or loading storage bins.		
1 foreman per 8-hour shift	$3.00	$9.00
1 machine operator per 8-hour shift	2.75	8.25
3 laborers per 8-hour shift	2.50	22.50
Ignition fuel, 100 gals. fuel oil	.07	7.00
Power, 150 horsepower equals 3,600 horsepower hours	.02	72.00
Sintering fuel, 18 tons fine coal	2.00	36.00
Repairs and supplies	....	15.00
Total	....	$169.75
Operating cost per ton		$0.85
Total operating cost including royalty, but not including the mining and crushing of the ore, for a nominal output of 200 gross tons per day of 24 hours		1.03
If 10 Standard machines were built, the plant would cost approx		$140,000.00
Daily bill for labor, supplies and power		691.50
Daily operating cost per gross ton of sinter		0.69
Royalty		0.15
Total operating cost, including royalty, but not including the mining and crushing of the ore, for a nominal output of 1,000 tons of sinter per 24 hours		0.84

are intended to be outside limits with the expectation that they will be reduced in actual practice. Also the cost per ton is based on the nominal output of 100 tons per day per machine. Later designs of machines allowing a 12-inch layer of ore on the pallets will allow a product of from 125-150 tons per machine per day of 24 hours.

All of the foregoing has related particularly to Mesabi range paint rocks and high moisture ores. But this process has a wider application. It is peculiarly and particularly applicable to those ores on many ranges that are in the twilight zone, so to speak, between low grade and readily merchantable ores. Referring to the Mesabi, there occur paint rock and limonite in varying proportions of each, so interlaminated as to make a mining separation impossible. Such ores will run from 48 to 54 per cent in dry iron, but they contain in the natural state from 18 to 24 per cent of free moisture together with an ignition loss of from 5 to 10 per cent. Such ores, in themselves, may be held undesirable for mixing purposes on account of their high moisture content. The operator does not want to tie up money in stockpiles of such ore and the fee owner wishes to get his royalty from it. With regard to all such ores, as well as those that are now considered low grade, a fairly exact determination may be made as to the advisability of sintering.

A bulletin of Monel metal has recently been issued by the Supplee-Biddle Hardware Co., Philadelphia. This includes illustrations and specifications of Monel metal tie rods, lag screws, washers, wire cloth, rope, nuts, sheets, etc. Monel metal is especially designed to resist the corrosion caused by acids.

Book Review

Business Administration, its Models in War Statescraft and Science, by Edward D. Jones. Published as a number of the Works Management Library by The Engineering Magazine Co., New York, 1914, and furnished by THE IRON TRADE REVIEW at $2, net.

This work by Professor Jones takes high and advanced ground and argues that under conditions existing in the present industrial age great administrators are demanded to conduct the complicated machinery of business. By tracing from the earliest dates the various lines along which greatness has been developed and the changing standards of the world's demands for greatness, he adduces the proposition that the same factors that made a great general in the days when arms were most admired, a great statesman when diplomacy was recognized as the most ambitious calling and a great scientist in the days when science presented opportunities for unusual recognition, may be applied to present industrial management.

He argues that success in dealing with men and affairs depends on certain basic propositions easily discoverable by studying the work of great administrators. Unfortunately, he says, rules and methods followed by leaders in business and finance usually are hidden deliberately and no records are left throwing clear light on their lives and acts, whereas military, diplomatic and other leaders have left memoirs that furnish clear insight into their methods and successes. Public and private records, correspondence and other sources also throw light on their careers.

The author has used these data from which to analyze definite primary principles of administration. He has exalted his theme and places his ideal high, seeing in the coming days man developing in his business administration to an extent that will place him on an equality with the great names of history.

Study of scientific management so far has expended itself on machines and processes. For the larger success, administration must work as great generals and statesmen have done, with the human factor, and as scientists have done, with universal laws. The best thought of the world is called on to bring its choicest offerings for the service of thinking workers in modern industry. Business administration should be raised to the rank of a profession, where it has a place and rightfully belongs.

The J. S. McCormick Co., Pittsburgh, manufacturer of foundry facings, supplies and equipments, recently completed the erection of a two-story office building, and another story has been added to the company's manufacturing plant. The output of the works has been practically doubled and the company is in better position to meet the requirements of the foundry trade than at any time in the past.

Table II

SUMMARY OF COSTS OF SINTERING

If the ore is available from pits or paint rock stock piles, assume a mining cost, based on a ton of sinter, averaging		$0.25
Assume an ore handling and crushing charge at the plant, based on a ton of sinter, averaging		.20
Sintering cost as previously indicated	$0.84	1.03
Interest and depreciation		.10
Transportation, rail and boat to lake ports		1.10
Insurance and commissions		.15
Total fixed charges per ton of sinter	$2.64 or	2.83
Sinter analyzing in iron like the shipment shown above would command the Old Range price on account of its superior structure. Such an ore would sell on the 1913 prices for approximately		3.70
Net profit per ton of sinter with a 2-machine plant		$0.87
Net profit per ton of sinter with a 10-machine plant		1.06

Making Bronze Valves---II

How Large Manganese Bronze Riser Valve Parts Are Finished and Tested in the Machine Shop

BY H COLE ESTEP

IN A PREVIOUS article in THE IRON TRADE REVIEW, the method of molding and casting the various parts of large bronze riser valves for the new Catskill water supply system for the City of New York was described and illustrated. Six 72-inch valves and twenty-five 48-inch valves are called for in the contract which was let by the Board of Water Supply, of the City of New York to the Exeter Machine Works of Pittston, Pa. The 72-inch valves weigh 42,900 pounds each when completed while the 48-inch valves weigh 19,500 pounds each. After the castings are cleaned and smoothed up in the foundry they are transferred to the machine shop for finishing and assembling. This article will describe some of the features of the machine work on this job.

The plant of the Exeter Machine Works occupies a plot of ground in West Pittston with a frontage of 400 feet on Montgomery street and 665 feet on the main line of the Lackawanna railroad. The machine shop, which lies with its long axis parallel to Montgomery street, is 75 feet wide and 350 feet in length. The office at the corner of Montgomery and Fremont streets is 40 x 50 feet, two stories in height. The main foundry building, which lies parallel to the railroad track, is 75 feet in width and 170 feet in length. Between the foundry and machine shop, as shown in Fig 14, are situated the structural shop, 50 x 100 feet, the blacksmith shop 40 x 60 feet, the pattern shop 40 x 90 feet, the pattern storage building 30 x 100 feet and a storehouse 40 x 85 feet. The combined floor area of the various shops is approximately 57,350 square feet.

A Substantial Machine Shop

The machine shop is a substantial brick structure with a monitor type roof. The main bay served by the traveling crane is 40 feet in width and the two side bays are each 17½ feet in width. A 20-ton Niles crane is used to handle heavy castings in the machine shop. This crane has a span of 40 feet and its runway extends out through the south end of the building over a spur track to facilitate loading finished material. The tools in the machine shop are driven through counter shafting and belts by electric motors on the group system, except some of the larger tools which are connected to individual motors. The tool equipment is modern and sufficiently extensive to handle a large variety of work. In addition to the usual array of ordinary lathes, planers, shapers, milling machines, boring mills, drill presses, etc., there is a large 48-inch lathe which was furnished by Edwin Harrington Son & Co., Philadelphia, a 20-foot Niles boring mill, and a large Niles horizontal milling machine.

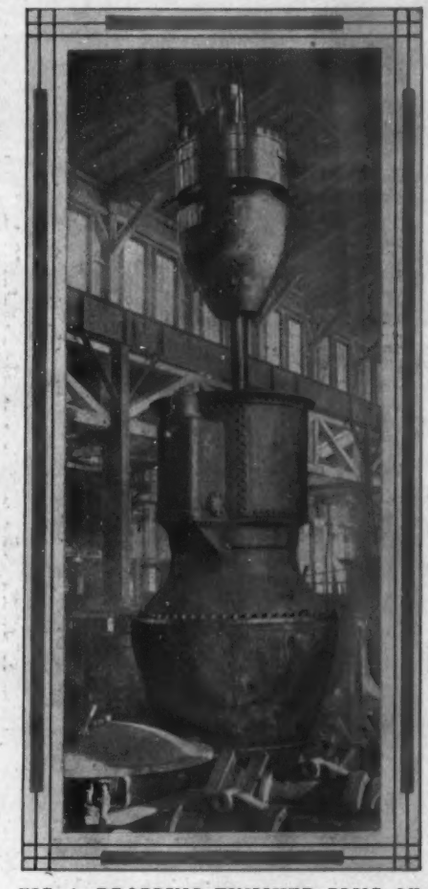


FIG. 1—DROPPING FINISHED PLUG OF 48-INCH VALVE INTO BODY

By referring to Fig 1 it will be noted that each riser valve consists essentially of a heavy bronze casing into which a spider is secured carrying a piston. A cylinder, to which the valve plug is bolted, fits over the piston. The plug is connected to an operating lever and link located in a lever pocket at the top of the valve. The various parts must be accurately turned and fitted so as to be absolutely water tight under heavy pressure. Particular care must be taken in machining the valve seat and the plug which fits on this seat in order to insure a tight fit.

How Bronze Is Machined

The bronze castings are machined in much the same manner as they would be handled if they were made of cast iron or steel. The manganese bronze from which the castings are made is a tough, homogeneous metal, which does not cut as easily as might be supposed. However, it shows no tendency to tear and it is not difficult to obtain a highly finished surface.

The cuttings speeds, feeds, and depths of cut, vary, of course, according to the the nature of the piece which is being machined. On the larger bronze pieces, however, the roughing cuts are taken at the rate of 96 feet per minute, with a 3-16 inch feed and the depth of cut of ¼-inch.

The allowable error in the machine work is about the same as that which is permitted in the manufacture of fine pumps and Corliss engines. The following extracts from the specifications for the valves, clearly indicate the unusual care necessary in machining these parts.

"The nature of the service required of these valves is such as to necessitate all material and workmanship being as nearly perfect in all particulars as possible. To this end all inspection will be rigid.

"Erection in the shop shall be to such an extent as may be necessary to determine the accuracy of the machine work on the various parts, or to the extent necessary for the purposes of testing. The test head and all piping and other appurtenances and services necessary for the various tests specified shall be furnished by the contractor. During the test erection all unfinished surfaces adjoining finished surfaces shall be chipped and filed to remove projecting corners or rough edges. All surfaces forming the waterways of the valves shall be ground and buffed or file finished. After the dismantling of valves and other apparatus, following the shop erection and test, identification or matching numbers shall be clearly stamped upon fitted bolts, collars, pins, and other parts where necessary in such a manner as to facilitate proper re-assembling.

"After completion each piston shall

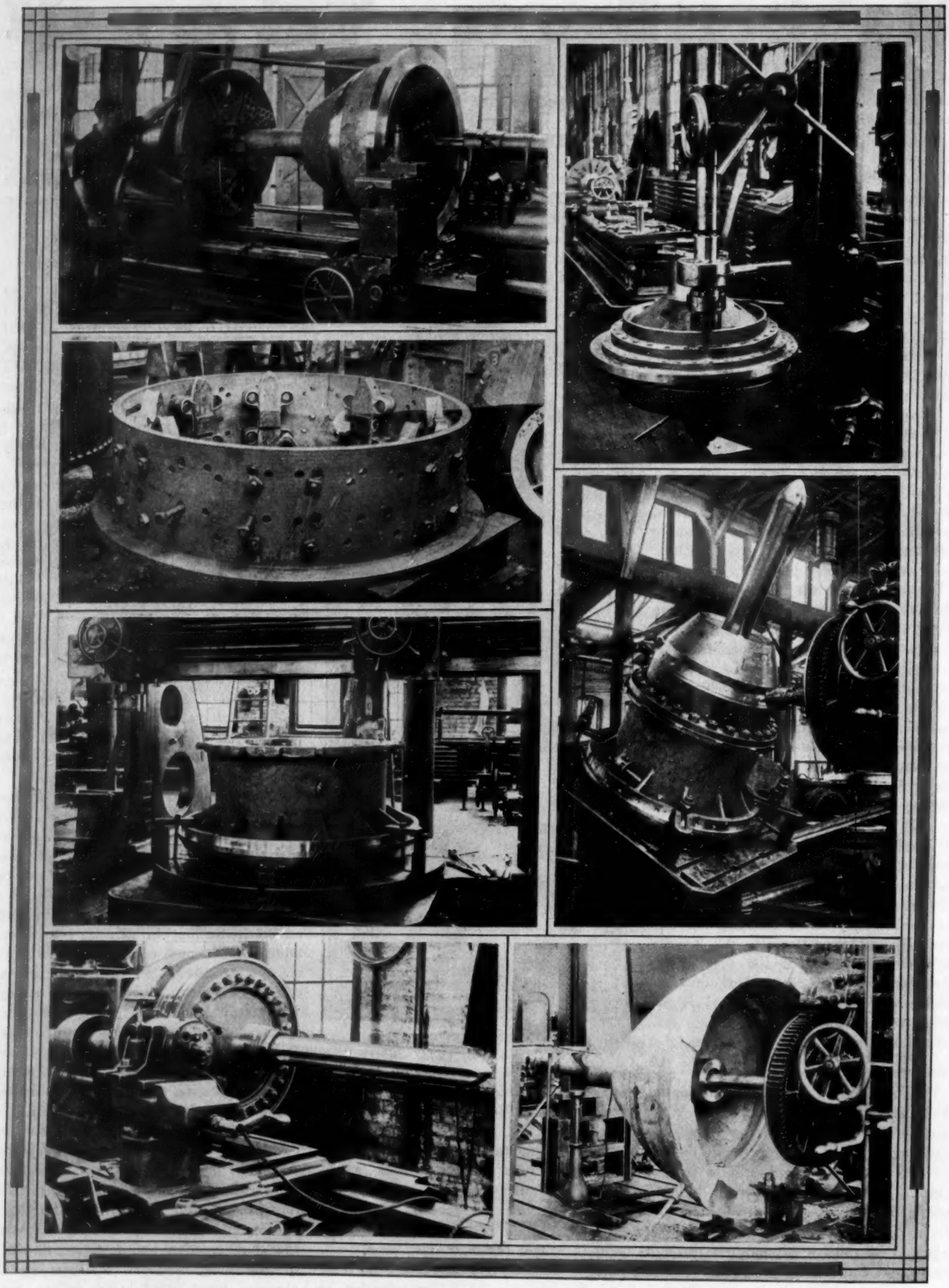


FIG. 2—TURNING OUTSIDE OF CYLINDER HEAD
FIG. 3—TAPPING THE PISTON FOR A 72-INCH VALVE
FIG. 4—BORING MILL JIG FOR TRIPOD
FIG. 5—BORING A VALVE CYLINDER
FIG. 6—DRILLING AND TAPPING 72-INCH CYLINDER
FIG. 7—GRINDING PISTON RINGS FOR 72-INCH VALVE
FIG. 8—BORING A 72-INCH CYLINDER HEAD

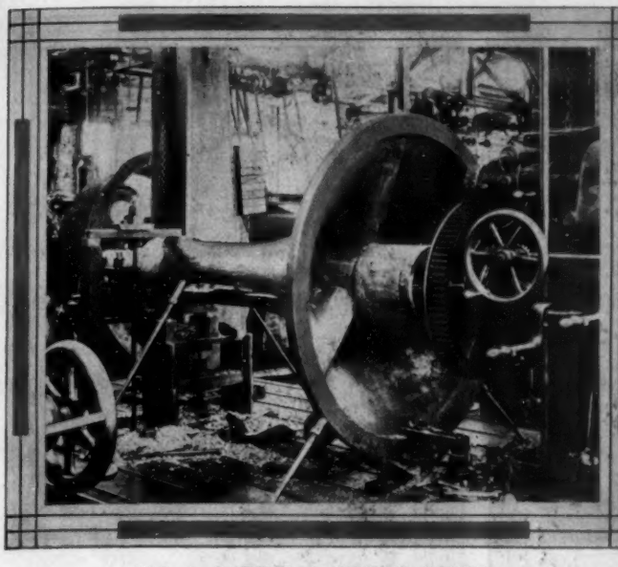


FIG. 9—BORING A PISTON COVER

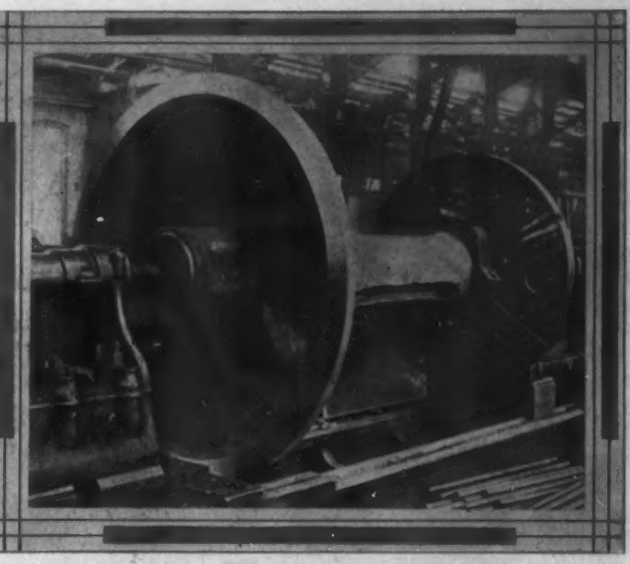


FIG. 10—TURNING A PISTON COVER

be installed at the shop in its own cylinder with the cover removed, the two being held in position by means of a yoke. Hydrostatic test pressure of 600 pounds to the square inch shall then be applied to the interior of the cylinder and maintained for 30 minutes. During this time all castings shall be water tight. The pressure shall then be reduced to 300 pounds to the square inch for 30 minutes, during which time the leakage past the piston rings shall not exceed one gallon per minute. After completion and erection, each valve shall be tested for the proper action of all moving parts. The shells, envelopes, lever pockets and pedestals shall be assembled and subjected to an internal hydrostatic pressure of 150 pounds per square inch for 10 minutes, during which time all castings and joints shall be water tight."

Parts are Interchangeable

The specifications also state that all the parts of the riser valves shall be so machined as to make them interchangeable, so that any riser valve plug will fit any riser valve body of the same nominal size, although made at different times and not fitted specially to each other. To obtain this result, jigs and templates were made in order to insure interchangeability. The tests made in the shop showed that the allowance of one gallon per minute for leakage past the piston rings was much larger than the actual leakage encountered. The leakage in the test of a 48-inch and also a 72-inch valve is given in the accompanying table. These results speak very well for the character of the machine shop work.

Each valve contains a number of pieces which are unusually difficult to handle in the shop. Fig. 9 shows the piston cover for a 72-inch valve being bored to receive the piston rod which works through a hole in the center. This is done on a floor boring machine, while the work is supported by steel rods. There were not enough pieces to be made to warrant the use of special fixtures and therefore each part had to be lined up separately by means of the adjustable struts.

After the piston cover has been bored, a centering piece is fitted in the end, as shown in Fig. 10 forming the support at the tail stock. A similar

FIG. 11—LARGE BRONZE CASTINGS IN MACHINE SHOP

FIG. 12—FORGING A HEAVY BRONZE TAIL ROD

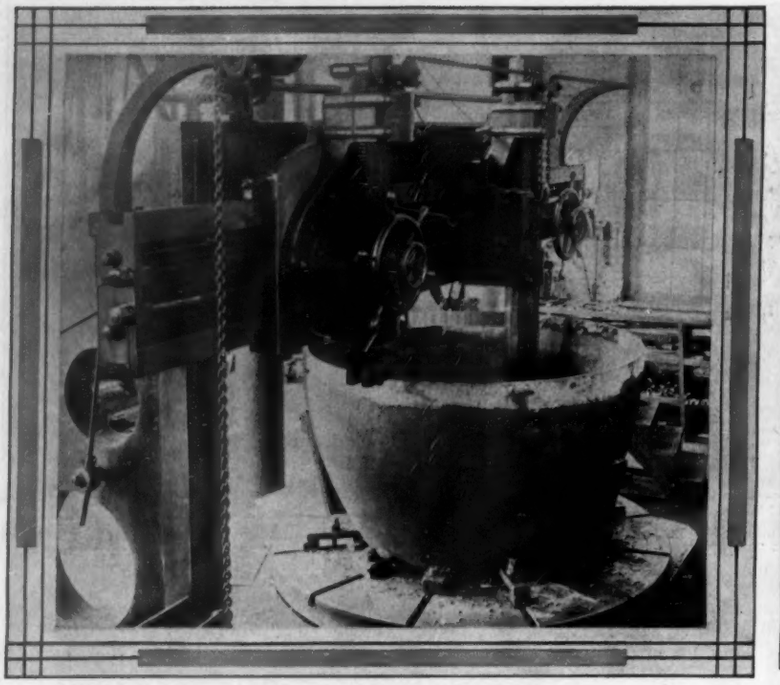


FIG. 13—BORING CYLINDER CASING

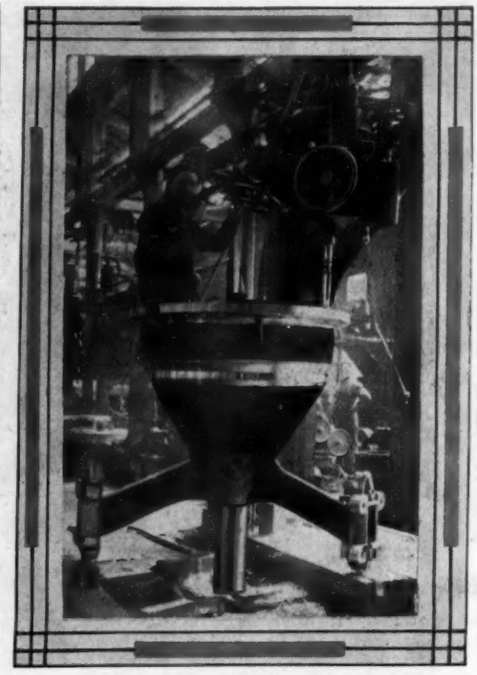


FIG. 15—A HEAVY DRILLING OPERATION

piece is fitted in the other end and the casting is driven in the lathe by a two part dog. The piece is 59 1-2 inches in diameter and weighs about 3300 pounds, which gives some idea of the machining problems involved. The spider casting, which is fitted to the top of the valve for holding the piston in place, has a spread of 71 inches and weighs 8700 pounds finished.

Fig. 8 shows a cylinder head for a 72-inch valve being bored on a horizontal machine. In the preceding article mention was made of the large annular riser or shrink head on the shell and cylinder castings. Fig. 5 shows how this surplus metal is cut off in the machine shop on a boring mill. The casting shown in this illustration weighs 4300 pounds finished and 9800 pounds rough as it comes from the foundry.

A cylinder for a 72-inch valve nearly ready for assembling is shown in Fig. 5. The radial lugs shown in this illustration are fitted to bear against the cylinder casing and support it against the water pressure. The joints between the cylinder and cylinder head, are metal to metal, no gaskets being used. The lever pocket, shown in the upper left hand corner of Fig. 1, is fitted water tight against the steel envelope at the top of the valve and presents several problems in machining. The circular flange in the upper end is bored on a boring mill, the side flanges afterwards being planed on a slotter. The pockets are bored and milled on the inside in pairs on the revolving table of a floor boring machine. Fig. 16 clearly shows the construction of the piston rings. These rings are similar to those used in a certain type of aeroplane motor. There are four rings in each piston, consisting of a specially formed strip or ring of No. 12 B & S gage manganese bronze. The rings are ground to fit the cylinder. In three of the rings, the lip is turned down so it will expand under the pressure from beneath. The upper ring, however, has its lip turned the other way to take care of any pressure that might come from above, as the pressure within the cylinder may be below that of the outside water during the first part of the closing stroke. The joints between the rings and the piston are made with pure linen paper boiled in paraffin oil.

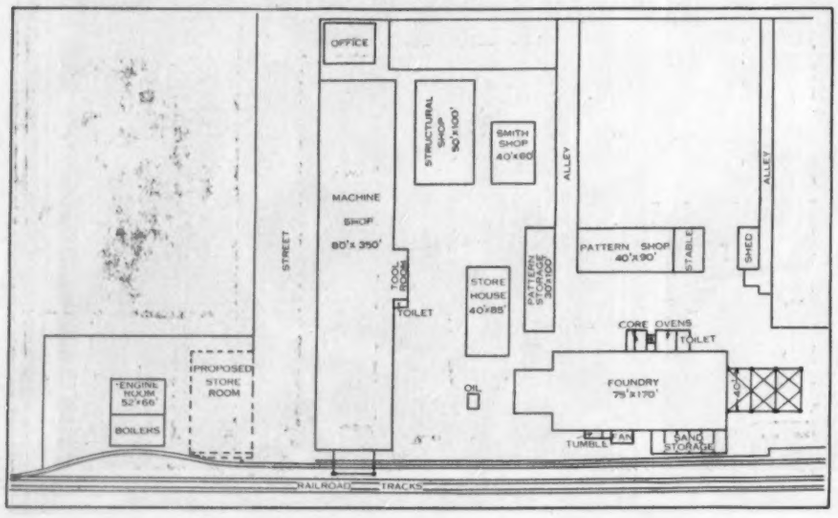


FIG. 14—PLAN OF PLANT OF EXETER MACHINE WORKS

The tail rods, which extend between the piston and the tripod are forged from bronze ingots under steam hammers as shown in Fig 12. The specifications state that the bronze from which these are forged shall have an ultimate strength of 70,000 pounds per square inch, with an elastic limit of 35,000 pounds per square inch, and an elongation of 28 per cent in two inches. The operating rods, which extend from the valve to the surface, consist of rolled manganese bronze sections 20 feet in length, fastened together by suitable couplings. The specifications state that the material shall be of such quality that a 9-inch length rod can be split into quarters and the four quarters subjected to a bending test tending to open the original outside surface of the rod. This material is also required to

DATA ON PISTON LEAKAGE TESTS

72-Inch Valve.

Duration.	Pressure lb. per sq. in.	—Leakage— Actual ounces.	Calculated gal. per hr.
10 min.	100	0.75	0.03
10 min.	200	5.25	0.24
10 min.	300	9.25	0.42
10 min.	400	3.50	0.38
10 min.	500	7.50	0.34
30 min.	600	26.25	0.39

48-Inch Valve.

Duration.	Pressure lb. per sq. in.	—Leakage— Actual ounces.	Calculated gal. per hr.
10 min.	100	57.25	2.58
10 min.	200	65.75	2.96
10 min.	300	50.50	2.27
10 min.	400	43.50	1.96
10 min.	500	36.25	1.63
15 min.	600	44.50	1.33

stand hammering hot to a fine point, and bending cold to an angle of 120 degrees to a radius equal to the thickness of the bar, without showing signs of fracture.

In addition to the work on bronze castings described above, the Exeter Machine Works handles a large amount of heavy machine work of a standard character in gray iron and steel. For some years the company has specialized on the manufacture of locomotive cranes and high grade electric traveling cranes. Recently a traveling crane of a new type with a lattice girder has been designed, which is said to weigh about 20 per cent less than cranes fitted with the ordinary solid plate girders.

The officers of the Exeter Machine Works include J. M. Thomas, president; A. L. LeGrand, manager; L. E. Phillips, machine shop superintendent and C. E. Schley, foundry superintendent.

The Nickel Plate railroad has undertaken a retrenchment policy affecting 2,000 shop and roundhouse employees between Buffalo and Chicago. Seven hundred men have been laid off chiefly at the Conneaut, O., shops. The Chicago shops have been put on a three-day-a-week schedule.

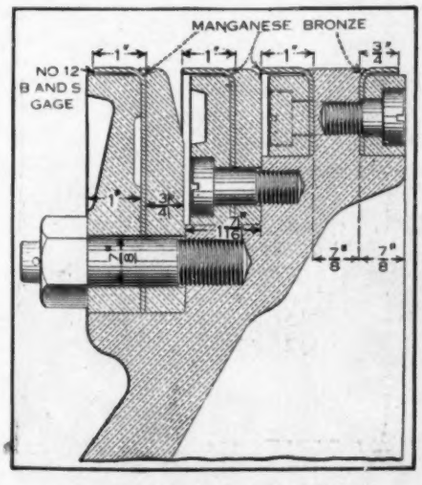


FIG. 16—SECTION OF PISTON

How to Repair Furnace

The following instructions cover a method of procedure in repairing a 5-ton basic rolling furnace. First, tear down both walls if necessary until you get down to a good, solid foundation. Then start on the front wall with basic bricks from the foundation up to 6 or 8 inches above the slag line, or level with the floor plate. Next lay silica bricks up to the skew back. It is well to rack back the walls a little and let them lean slightly outward toward the iron work. The back wall should be solid magnesite brick clear up to the skew back and the roof brick ought to be put in perfectly dried. Before starting a fire, the furnace should be swept out perfectly clean to free the bottom from silica. Keep a very slow fire at first and do not let the flame hit the roof. In order to keep the flame down drop the damper until the fire smokes. It is just as well to smoke the brick for a few hours. Heat the furnace up very slowly for about 48 hours, when more wood may be added and the heat increased. After another day you can use a long oil burner, which will extend out into the furnace as far as the front port.

The tapping hole can be built at any angle to suit the melter. The bottom of the hole should be about 2 inches above the slag line. When turning the oil onto a newly repaired furnace, carry as little air pressure as possible on the start, gradually increasing as the furnace gets warmer. If there are any signs of the brick chipping, it would be well to slack off the heat. If the furnace is properly heated up, according to these instructions, it should not have any cracked bricks in it.

It is well to place some kind of a canvas over the bottom while the bricklayers are working on the roof. It is not necessary to remove the checker bricks on making every repair, but it is well to examine them to see if there is any oxide of iron covered over the top. Sometimes this can be blown off with air pressure and a long pipe. The flues ought to be examined every six months to see if any oxide of iron or dirt has accumulated. It is well to go through the flues from the furnace to the stack. All bulkheads and the roof generators ought to be kept pointed up carefully at all times, even while the furnace is running to prevent cold air from sucking into the generator. Slag pockets ought to be dug out after each repair.

Fluor-spar, magnesite and dolomite ought to be kept separately, a good distance apart, in order not to get the fluor-spar mixed with either of the other two. It is a flux and would cause a pumping at the bottom which would result in danger of losing a heat.

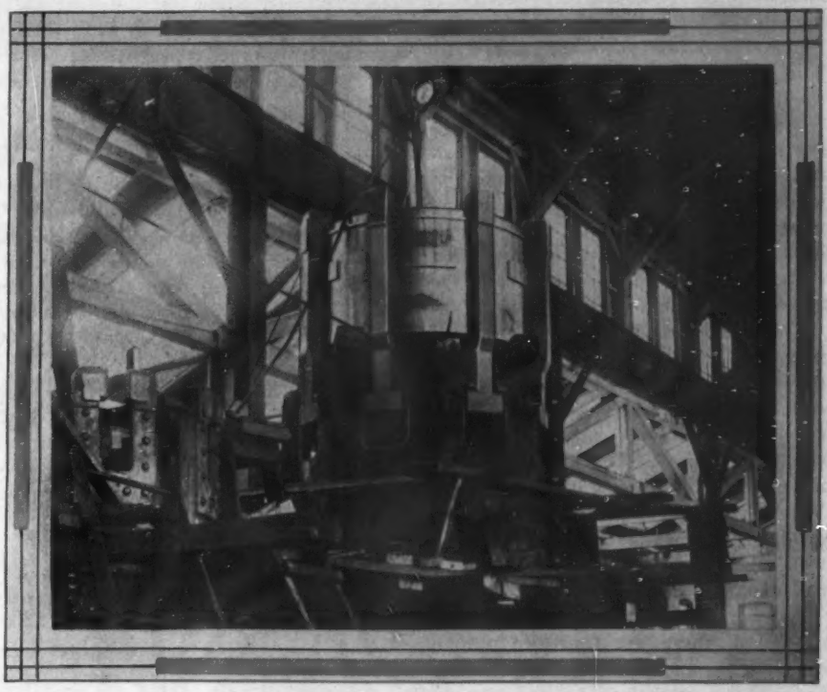


FIG. 17—VALVE ASSEMBLED FOR TESTING

The P. F. Murk Foundry Co., South Beloit, Wis., is having plans made for the erection of a 60 x 80 foot addition next fall.

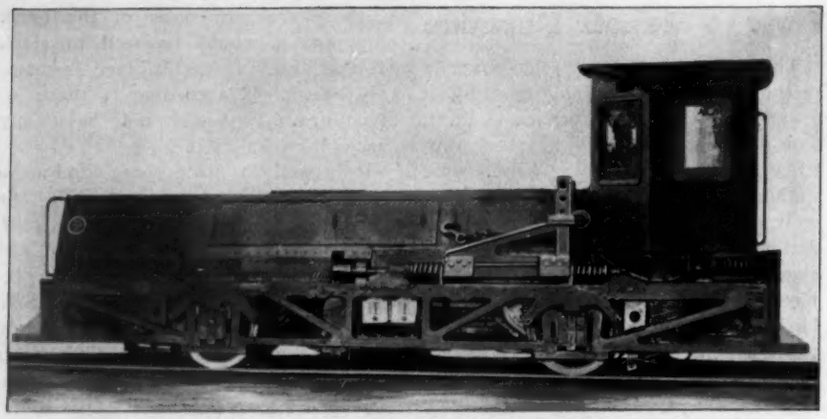


FIG. 1—ELECTRIC LOCOMOTIVE EQUIPPED WITH STEEL ARMS

New Type Dock Engines

Three electric locomotives last year handled 60,000 cars at the ore unloading docks of the Ohio & Western Pennsylvania Dock Co., Cleveland. The service was so satisfactory that they are being used again this year.

The locomotives do not run on the same tracks as the cars they handle, but operate on narrow gage (42-inch) parallel tracks. Power is obtained from two rails lying inside those on which the locomotives operate. These rails are protected by a wood covering.

The most novel feature in connection with this type of engine is that they are not attached to the cars by couplings, but each locomotive carries two steel arms for pushing cars, as shown in Fig. 2. The arms when not in use are in an upright position. When moving cars, these pushers are dropped by means of compressed air to a horizontal position and engage the end sills of the cars.

As an illustration of the mode of operation, there are four ore unloaders and four loading tracks at the Cleveland docks. One electric locomotive can serve two loading tracks. A string of empty cars can be pushed forward on one track and the first car placed directly under the unloader serving that track. While ore is being dumped into this car, an operation requiring only about three minutes, the locomotive can return and spot a car on a parallel track under another unloader.

By this means accurate spotting is secured and regardless of the length of the train being loaded, the operator of the locomotive is at all times in a position to spot the empty cars accurately. The pusher is inserted between two cars which enables the motorman to propel or stop the car accurately and quickly. A hook and cable can be used when there is only one car to place in position.

The locomotives are of the Baldwin-Westinghouse make and were designed along lines suggested by the ore company. They weigh 25 tons and have steel frames. The motors are 125-horsepower, 250-volt, Westinghouse commutating-pole type. Two operators are required, one in the engineer's cab and one who serves as a brakeman.

Each locomotive can push a train of 35 empty cars or can handle 20 loaded cars. Each of these cars weighs 34,000 pounds and has a capacity of 100,000 pounds. The usual loading weight, however, is 110,000 pounds, so that in handling a train of 20 loaded cars, the locomotive pushes a load of 2,880,000 pounds. A yard crane permits the shifting of any locomotive from one set of tracks to another, so that with the three engines now operating at the docks, there is little possibility of operations being suspended through a breakdown.

At the first National Efficiency Exposition and Conference, held recently in New York, an interesting 2,000-pound hand truck was displayed by the General Vehicle Co. These trucks are electrically driven by means of storage batteries and are used for handling material in warehouses and factories. It is said that there are now over 300 trucks in service in 30 cities. The short wheel space, ease of control and the fact that the truck can be run backward and forward with equal facility make it particularly useful in congested quarters. One company operating a fleet of 21 trucks in its plant reports a daily saving in labor of $63.

Chromic Iron Ore

"A notable feature of the chromic iron ore industry in 1913 was the increased production and sale compared with that of 1912," says J. S. Diller, in a recent publication of the U. S. Geological Survey. "The total output of chromic iron ore in this country comes from one producer in California. In 1912 the total production was 201 long tons, valued at $2,753. In 1913 the production was 255 long tons, valued at $2,854, a gain of 27 per cent in quantity but of less than 4 per cent in value. The ore is reported to contain 47 per cent chromic oxide.

"The two new mines reported last year, one near Livermore, in Alameda County, and the other near Piedra, in Fresno County, were not operated in 1913. The production of 1913 came wholly from L. H. Brown's mine on the south side of Little Castle Creek, in Shasta County, about 2½ miles south of Dunsmuir. This mine is near the Siskiyou county line, and Mr. Brown's claims extend into Siskiyou county, but the open cut from which the ore is now obtained is well within Shasta county, although ore taken from the same place last year was reported as mined in Siskiyou county because the place is near the post office of Dunsmuir.

"The largest production of chromic iron ore ever recorded in the United States was in 1894, when the output reached 3,680 long tons, valued at $53,231; the highest value was attained in 1883, when an output of 3,000 tons had a value of $60,000."

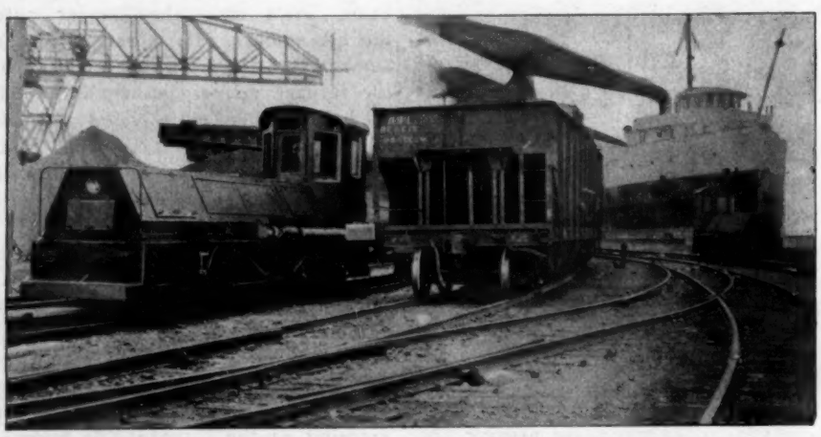
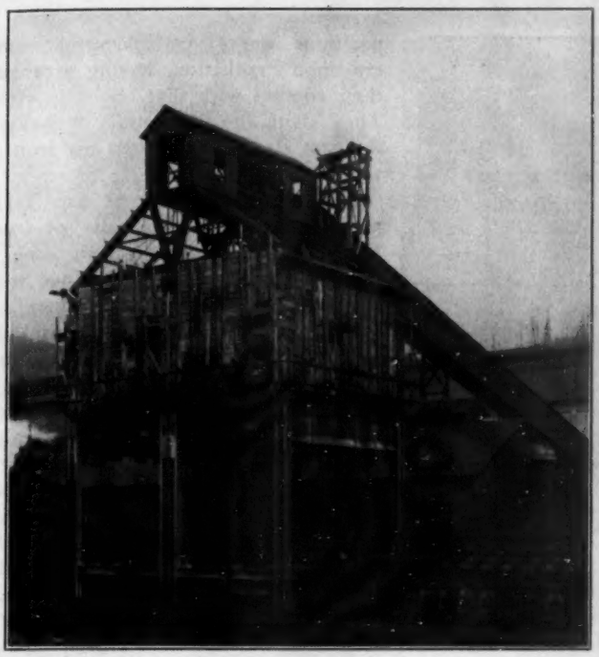


FIG. 2—HANDLING ORE CARS AT PENNSYLVANIA DOCKS



Use of Concrete in Coke Ovens

Four Typical Illustrations Showing the New Ovens of the Cambria Steel Co. Are Presented

(ONE)

The coal bin shown above is built of steel, with reinforced concrete side walls. The nature of the reinforcing, which consists mainly of vertical steel rods is clearly shown. After the rods are in place, a wooden form is erected, in which the concrete is poured.

(TWO)

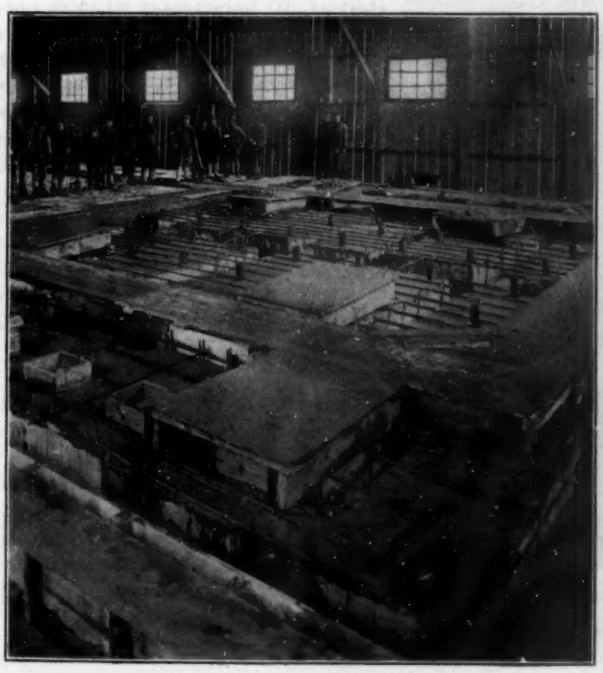
To carry the coke oven pusher track over an underground passage way a reinforced concrete girder was constructed. It is shown at the left in the illustration. At the right may be seen a reinforced retaining wall, forming part of the coke loading wharf.

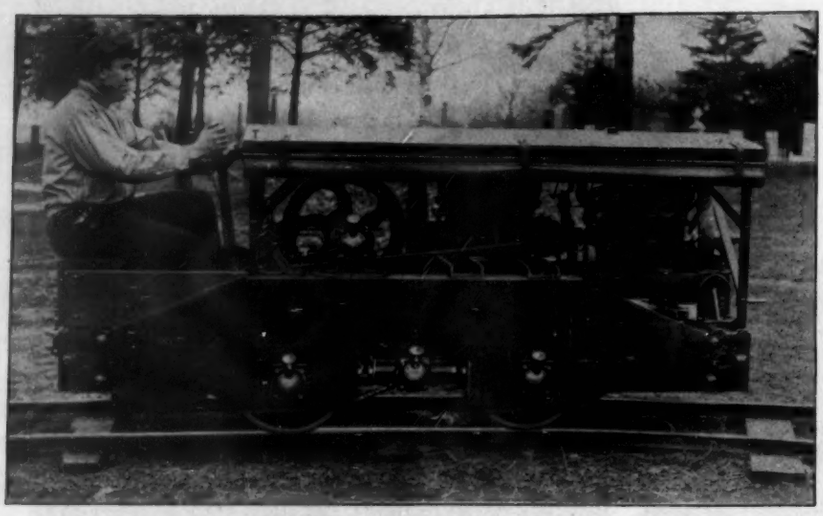
(THREE)

The coke ovens themselves are supported on a reinforced concrete monolith, which must be constructed with unusual care, to avoid settling. The reinforcing bars are made of twisted steel and are bedded in the concrete both vertically and horizontally. Wooden forms are used.

(FOUR)

The ovens are carried on a series of large reinforced concrete beams, supported by heavy square columns. The tops of the columns are tied together with a concrete girder of unusual size and the space between the beams is filled with reinforced concrete slabs.





GEARLESS GASOLINE LOCOMOTIVE

Gasoline Locomotive

The J. D. Fate Co., Plymouth, O., has recently placed a new gasoline industrial locomotive on the market. The engine is air-cooled and the machine is built with no gear wheels, clutches or differentials. It has a dozen forward speeds and an equal number of reverse speeds. The tractive effort is the same whether the locomotive is running forward or backward. The final drive is by means of a chain and sprockets. It is built to fit various gages of track and weighs from 2½ to 3 tons.

It is said that one of these locomotives in the service of the National Fireproofing Co., Haydenville, O., hauled 2,510 tons of clay and coal in seven days, consuming 41 gallons of gasoline and seven gallons of lubricating oil.

"National Forging Talks No. 2," issued by the National Machinery Co., Tiffin, O., discusses the method of designing and constructing bed plates for the forging machines built by this company. The bulletin includes some data on the relative advantages of cast iron and semi-steel for the bed plates of heavy machinery.

Experimental Furnace

To give students an opportunity to correlate theory and practice in the manufacture of iron and steel, an experimental electric shaft furnace has been built in the electric furnace laboratory of the Carnegie Institute of Technology, Pittsburgh. Five members of the senior class, specializing in metallurgy, have been operating the furnace several weeks. F. F. McIntosh, assistant professor of metallurgy and at one time connected with the Bethlehem Steel Co., South Bethlehem, Pa., is in direct charge of the work. These students hope to obtain positions in the iron and steel industry upon graduation, having arranged their courses with that object in view. They claim the distinction of making the first electrically-melted pig iron in the Pittsburgh district.

The electric furnace at the Technical schools has a capacity of from 1,500 to 2,000 pounds of pig iron a day. It consists of a shaft, lined with fire brick, and connected to flues for carrying away the gases resulting from the reduction of ores. The burden is charged from a platform level with the top of the shaft into a crucible lined with fire brick and magnesite.

The furnace operates on single phase current, 60 cycles, at from 30 to 60 volts when hot and at from 150 to 300 volts when starting cold. The current is carried into the furnace by 4-inch graphite electrodes, through water-cooled jackets and specially designed electrode holders. The furnace absorbs 100 horsepower when in operation.

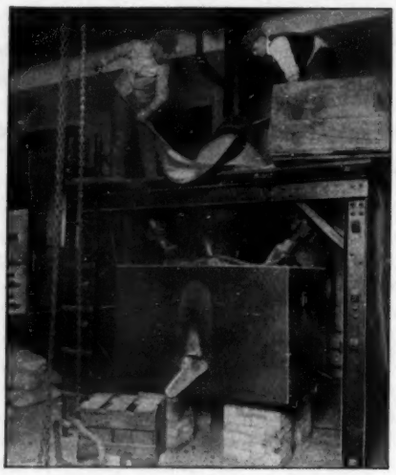


FIG. 2—ELECTRIC SHAFT FURNACE

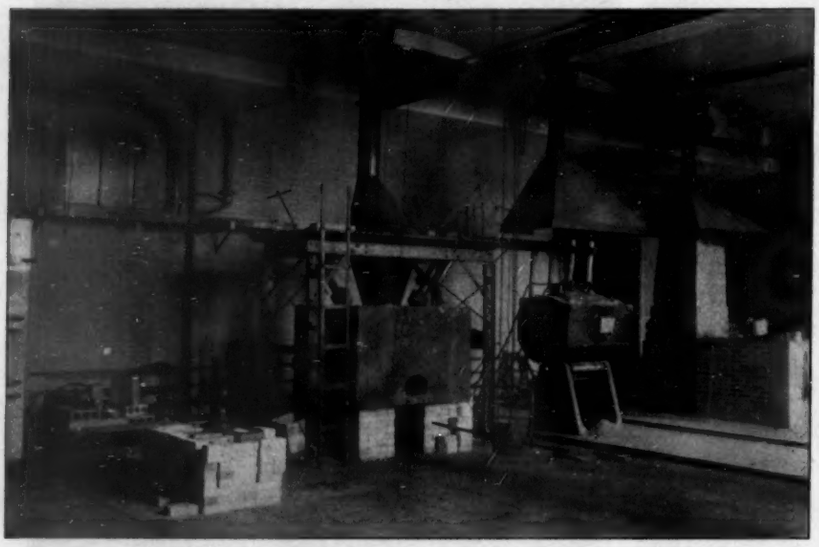


FIG. 1—ELECTRIC FURNACE LABORATORY AT CARNEGIE INSTITUTE OF TECHNOLOGY

The shaft usually is started using crushed coke to form a resistance, and when the crucible is hot the furnace is burdened. The metal and slag are tapped through the same hole at the bottom of the furnace. Usually the metal is refined in another electric furnace in the laboratory, to make different grades of steel. The steel is cast in ingots, 3 inches square, and then reheated and worked down under a power hammer in the forge department.

Students operating the furnace estimate it requires about one-quarter of an electrical horsepower-year per ton of pig iron and about one-third of the amount of carbon used by a blast furnace. Charcoal is being used as the reducing agent, as coke has not worked successfully in the electric furnace.

Arc Welding

The subject of arc welding is receiving a great deal of consideration at the present time by railways and industrial concerns because of the many advantages it possesses for certain kinds of work. It is particularly adapted to various uses in machine shops and foundries. Worn parts of machines can be built up prior to machining. Broken parts of steel castings can be welded together. Often defects develop in new castings, after considerable machining has been done. The machining and castings, in many cases, can be saved by repairing with the electric arc. Castings with blow-holes and sand-holes can often be very quickly repaired. Risers and shrink-heads can be cut off.

In steel mills, there are many places where the electric arc can be used to great advantage, often resulting in a considerable saving. The ends of wobblers and pinions, which have become badly worn, can be built up to their original size. Tap holes in blast furnaces can be burnt out in a very short time.

FIG. 1—WELDING A STEEL RING

Realizing from past experience, the practical value of the electric arc for general welding purposes, the Westinghouse Electric & Mfg. Co. has developed a standard line of electric arc welding equipments. They are simple in construction and easy to operate. Complicated relay schemes for automatically inserting resistances are eliminated. Ample protection is secured by circuit-breakers and special arrangement of the resistance. The welding generator consists of a special 75-volt, commutating-pole, direct-current machine, either belt or motor-driven.

The instrument and control panels are composed of two sections. The upper section contains the indicating instruments, protective apparatus and switches arranged for regulating the welding current, and the lower section contains the starting and protective equipment for the motor-generator set. It is often desired to have several welding circuits connected to one generator. For this arrangement a control panel is provided for each circuit. Each panel can be located at the most desirable place. Metal or carbon pencil welding can be done from any of these panels, independent of all others, and one or more arcs can be operated simultaneously.

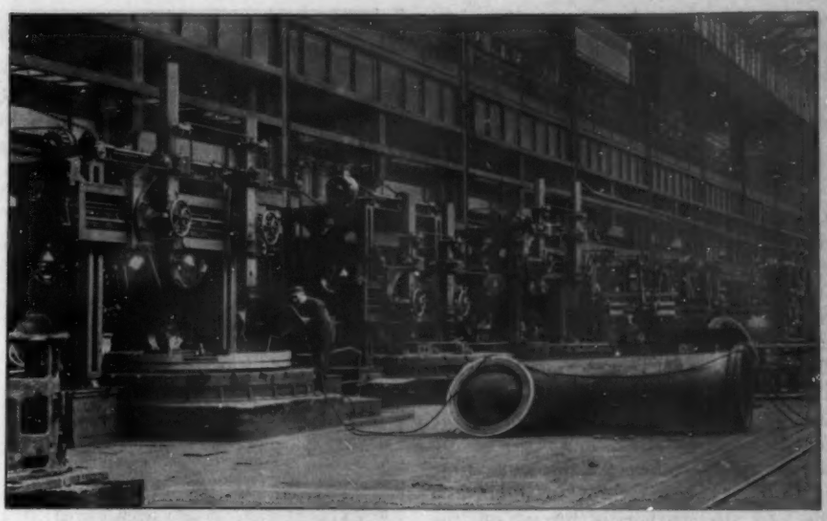
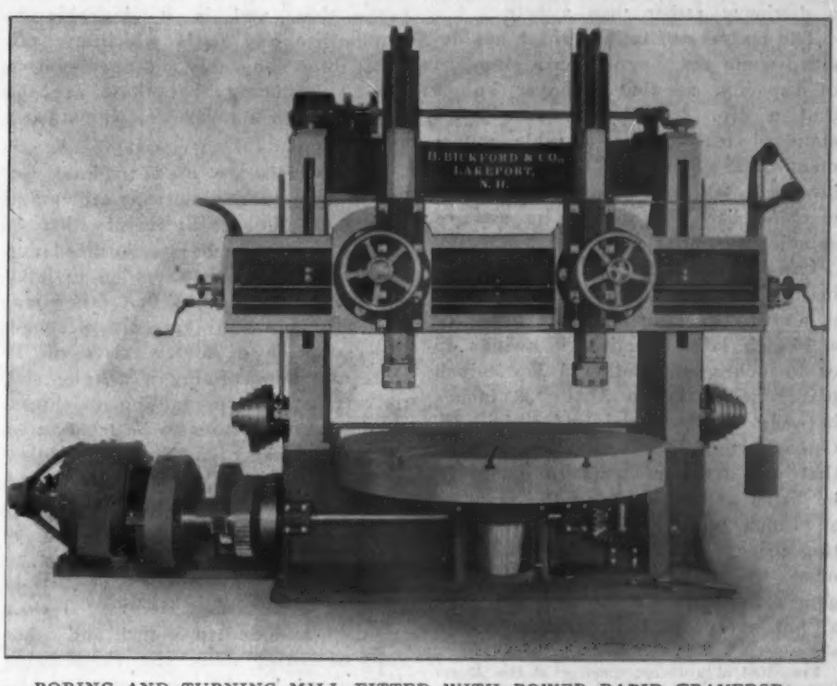


FIG. 2—WELDING A JOB ON A MACHINE TOOL

The Invincible Blow Pipe Co., Chicago, has increased its capital stock from $2,500 to $7,500.

Boring and Turning Mill

The accompanying illustration shows a new boring and turning mill which recently has been placed on the market by H. Bickford & Co., Lakeport, N. H. The power rapid traverse, which is a feature of this machine, is arranged for rapidly moving the tool spindles as well as the saddles. It is of simple construction and is easily operated through a handle conveniently located at the end of the rail. The rapid traverse is controlled independently of the table, and may be operated while the latter is at rest. If the mill is driven by an electric motor, the traverse is operated from the cross rail motor. Safety frictions are provided to protect the machine from injury by careless operation. These mills are built

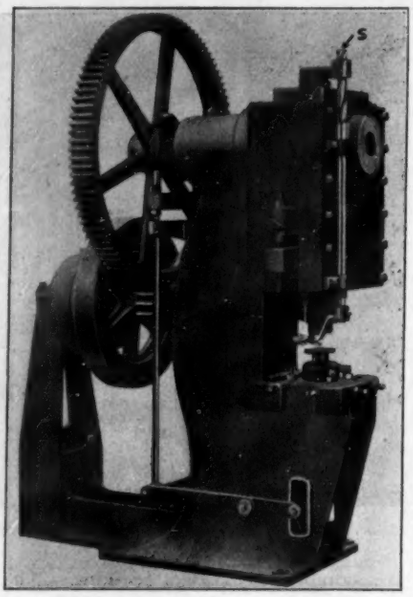


BORING AND TURNING MILL FITTED WITH POWER RAPID TRAVERSE

with swings ranging from 50 to 96 inches.

Washer Making Machine

The Joseph M. Mason Machine Co., Philadelphia, has perfected a washer-making machine which embodies several interesting features, among which is a carrier plate that removes the product after it has been cut. The machine is suitable not only for cutting washers, but for forming various small hardware specialties. After the washer has been cut, it is held in the machine by friction and carried up with the upper die. At the same time the carrier plate swings in under the die and the washer is forced off the upper die by coming in contact with a shoulder at the top of the stroke. This causes the washer to drop onto the carrier plate, which then swings out to the side of the machine, where the washer is deposited in a box. The carrier now being out of the way, the two dies come together again and cut another washer, which is carried up by the upper die and the process described above is repeated. The movements of the carrier plate are controlled by the twisted shaft and arm shown at *S* in the illustration. The carrier plate is said not only to speed up the machine, but makes it safer to operate, inasmuch as the workman has nothing to do but to handle the plate from which washers are cut.



AUTOMATIC WASHER MAKING MACHINE

The construction is simple and easily adjusted. The machine is heavily built. It is provided with cut gears and may be arranged for either belt or motor drive. The operation is continuous, there being no treadle. The machine is designed so that it may utilize scrap plates and sheet metal or even old boiler tubes. Under ordinary circumstances, no rolling, flattening or shearing to size is required, except in the case of boiler tubes. These are usually rolled flat and then placed in the machine, two washers being cut at one time. It is said that the machine can make special washers with countersunk holes at the rate of from 40 to 60 a minute. By hand, the same washers are made at the rate of one a minute.

The Standardization of Machinery

BY FRED H COLVIN

THE advantages of standardization of parts which are or may be used together are becoming more and more apparent in all manufacturing and are now being considered by builders of such machines as lathes, planers, milling machines, etc. The question is how far can this be carried, for if carried too far, it might become a detriment rather than a help.

The builders of milling machines decided some years ago upon a standard of capacity, so that a buyer knows that a No. 2 miller of nearly all standard makes, has a table movement of 28 x 8 inches. This does not, however, say how much power each machine has nor specify its size of spindle or similar parts.

Lathe and planer builders give nominal sizes in inches and feet, but there is no way of knowing from a list of a 14-inch lathe whether it swings 15 or 16 inches, or whether a 36 x 36-inch planer will take in 37 or 38 inches between housings and under the rail. One effect of this is to allow a lathe that will actually swing 16 inches to be listed as and sold for the price of a 14-inch without the odium of cutting price. Some over size allowance must, of course, be made, but the general opinion seems to place this at not over 1 inch, so that a 14-inch lathe will swing over 14, but not over 15 inches, with the same allowance on planers and other machines.

After standardizing the work-holding capacity of machines, the question of what parts can be standardized to advantage must be considered. How far is it desirable to go, even were standardization not an extremely difficult proposition, and is it desirable to standardize any parts which are not used interchangeably in the modern shop? Assuming that these are the only parts to standardize, which parts are they?

Slots which are used to hold fixtures, as in milling machine tables and in planers, fall easily in the list of desirable parts to be standardized and this might easily be extended to lathe carriages, boring mills and other machines to which fixtures are attached. The adoption of a few sizes of T-slots and apportioning a definite size to certain sizes of milling machines, would enable fixtures to be transferred from one make of machine to another of the same size. Should it happen to be desirable to use this attachment on a large miller or on a planer or boring mill it might be necessary to use adapters. These, however, could also be standard. Definite T-slots could be assigned to 36-inch and other sizes of boring mills, etc., these being determined by the experience of the user as well as the maker. The exact size, however, is not of so much importance as the fact that they be standardized.

Standard bolt and cap-screw head sizes are a great convenience. The machine with a single wrench to fit all bolts, tool block, carriage stops, etc., is not often impossible, if it be made double-ended, and while it may not be advisable to limit design by standardizing the size of bolts on a 16-inch lathe, there are probably many cases where they might be interchangeable without detriment. Beyond this, the problem becomes increasingly difficult.

There are some who advocate the standardization of lathe spindles, bearings and noses, but this seems to be treading on dangerous ground as well as being of doubtful utility. While there may be cases where it is convenient to be able to interchange chucks and face plates, these are few and far between in modern manufacturing. It may be a convenience in the jobbing shop, but it is seldom used elsewhere and is not to be considered where accurate work is to be done. Those who have tried know that it is impossible to secure really accurate work unless a piece is finished at one setting of the chuck, in many cases a special chucking plate or seat being

(*Continued on page* 1108*b*.)

Presented at a recent meeting of the American Society of Mechanical Engineers.

NEWS OF THE IRON MINES

Activities of the Lake Superior Ranges and other Districts

Preparatory to maintaining its Mesabi production after the first of next year, when the lease of the Hill ore lands expires, the Steel Corporation is engaged upon the range in a large amount of development work. Ten new properties are being opened. One of these—the Leonidas, near Eveleth—will be the biggest underground mine yet developed in the Mesabi country. It has been estimated that the ore body contains close to 20,000,000 tons. Mining will be from a steel and concrete shaft, 400 feet in depth. Other large underground properties will be the Duncan, at Chisholm, and the Philbin, near Hibbing. The Steel Corporation's new mines also will include the Minnewas, Sullivan, Wanles and Prindell, in the Virginia district; the Vivian and Graham, near Biwabik, and the Dean, near Buhl. The various properties opened in the Hill lands will, after Jan. 1, next, be operated by the Arthur Mining Co., a Great Northern subsidiary. This concern already is developing mines in tracts surrendered by the Steel Corporation heretofore, and by the opening of the season of 1915 it will be prepared to produce extensively, not only from the workings now under Steel Corporation control but from deposits it is itself making available. Considerable shipments will be made the present year, in fact. Some of the Arthur company's properties are the Hill Annex, Smith and Dunwoody.

One of the concerns most active in searching for one in the Lake Superior region, the Jones & Laughlin Steel Co., Pittsburgh, has under way in the extreme western part of the Mesabi range an additional exploration. This is at Kintzville, close to the Mississippi river. The company has under option in that locality a large acreage formerly held by the Steel Corporation and it is believed several mines eventually will be developed.

After having expended large sums of money in a futile endeavor to develop a profitable producer, the United States Steel Corporation is withdrawing from the Baraboo field of Wisconsin. Its mine at North Freedom is being dismantled. With the pumps and the other machinery removed, the property will be abandoned. It is at this mine that the last operations in the field were conducted. Other tracts tested had previously fallen by the wayside.

A few years ago, it appeared probable the Baraboo country would vie with some of the districts of the Lake Superior region as a source of iron supply. Exploration with the diamond drill had shown the existence of ore and it was surmised that with shafts put down and lateral development undertaken, the deposits would be found satisfactory in quantity and quality. The entry of the Steel Corporation was hailed as an event of great significance. But the district has not come up to expectations. Not only is the ore liberally mixed with rock, but water is present in such abundance as to make operations decidedly expensive. On one level at its North Freedom mine, the Steel Corporation had in commission no less than nine pumps. So wet is the sandstone formation that it is estimated that with the machinery stopped the property will fill with water within a hundred minutes. Threatened adverse taxation legislation also discouraged the operators.

The Republic Mine

It is understood that the Republic mine was relinquished to the Cleveland-Cliffs Iron Co. by the Cambria Steel Co. for a consideration of $600,000, which sum is to be paid, not in cash, but in ore. A large acreage is included in the transaction. No exploration on the various tracts concerned will, however, be undertaken at this time. It is the belief that not only will the Lake Superior & Ishpeming railroad, in which the Cleveland-Cliffs and the Jones & Laughlin Steel companies are jointly interested, be extended to the Republic mine, but the Cleveland-Cliffs Co. will materially enlarge the hydro-electric plant which is part of its newly acquired possessions. This plant is on the Michigamme river, the waterpower of which is capable of much more extensive development.

Concentrating Plant

While the Jones furnace is in course of erection at Marquette, Chicago interests are engaged at the old Kloman mine at Republic, in the western end of the Marquette range, in installing a concentrating plant for the treatment of low grade ores. It was at the Kloman property that Mr. Jones erected his second experimental furnace. The proposed concentrator is designed merely for testing purposes and it will, it is understood, have a capacity of only 20 tons a day. There is no small amount of interest in this process, also. It is stated that funds are available for operations on an extensive scale, once it has been shown that the method of concentration to be tried can make ores deficient in iron a valuable commodity. For the purpose of raising the grade of the product of the mine, Rogers, Brown & Co. are installing a sorting system at their Portland property at Michigamme, Marquette range. Mined by steam shovel after having been blasted, the ore will be treated in a large crushing plant erected a year ago. The material will pass from the crusher to the shipping pockets, conveyed there on a wide rubber belt, and as it passes them a force of four to eight men will pick out the rock. It is figured that the grade can be improved fully 10 per cent. The expected production this season is 100,000 tons.

May Close Barrows Mine

Brainerd, Minn., June 15.—The Barrows mine at Barrows, whose fee owners are the Brainerd Mining Co., will probably be closed in a short time unless some arrangements are made with other parties to continue the operation of the property. The Virginia Ore Mining Co., a subsidiary of the M. A. Hanna & Co., of Cleveland, has served notice on the fee owners that the lease will be canceled on June 29. The pumps have been pulled. The Barrows is shipping from its stockpile.

On the north range, the Cuyuna-Mille Lacs mine has started shipping from its 25,000 tons stockpile and the Cuyuna-Duluth at Ironton will also soon commence to ship. Superior men interested in the Barrows-Mississippi Iron Co. were on the range with John Wahl and it is said will soon commence drilling their property near Barrows townsite.

Stockholders of the Brainerd-Cuyuna Mining Co. held their annual election in Brainerd and re-elected all officers, as follows: President, F. A. Farrar; vice president, Henry Nelson; secretary-treasurer, Edmond Ingalls. General Manager Charles C. Jones' report was received with much satisfaction. The No. 2 shaft in the city limits of Brainerd has almost reached ledge.

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

In New York the machinery market has displayed some improvement during the past week, both sales and inquiries being reported in greater volume. The largest buyer was the Bethlehem Steel Co., which closed for three lathes and a radial drill. Among the inquiries is one for the Otto Coking Co., for locomotive cranes to be installed at Buffalo. The Taylor-Wharton Iron & Steel Co. is in the market for a number of frog and switch planers to be installed in its proposed new plant at Easton, Pa. There is a fairly good business in cranes under negotiation. The largest prospective crane buyer is the government, which has opened bids on three 3-ton cranes for the Mare Island navy yard, and two 40-ton, four 5-ton and one 15-ton for the Puget Sound navy yard. Awards of these cranes are expected before July 1. There is a fairly active demand reported for some lines of contractors' machinery, especially concrete equipment. Foreign demand for American machinery is very dull.

In Pittsburgh machine tool dealers say the market has been looking upward the last two weeks, and some believe moderate activity soon will be enjoyed. Builders of special machinery for fabricating shops have received a rather large number of inquiries, and several engineers, who make a specialty of designing blast furnace equipment, describe conditions as slightly improved. One of the large builders of heavy mill machinery continues to operate at less than 50 per cent, but some plants still are running at capacity.

In Cincinnati the foundry business continues to drag along with no indications of improving. Reports from southern and some northern territories state that better orders have caused a heavier melt since the first of June. The machine tool trade is very slow, and business done during the first half of June was about equal to that of either the first or last half of May. Second-hand machinery is better than new machinery, but is disappointing. Refrigerating, metal-bending and woodworking machinery and lathes are the best in demand.

EASTERN STATES

BOSTON—Fred T. Ley & Co., inc., Springfield, have been awarded the contract for erecting a factory for the Holtzer, Cabot Co. of Boston, to cost $225,000.

FITCHBURG, MASS. — The Fitchburg Enamel Co. plans a $2,000 addition to its enameling plant at 37 Culley street.

HARDWICK, MASS.—F. P. Sheldon & Sons, engineers, Industrial Trust building, Providence, R. I., are preparing plans for additions to the mill of the Gilbert Mfg. Co., located here.

SOUTHBRIDGE, MASS.—The Optical Lens Co. has been incorporated with a capital stock of $100,000. George H. DuPaul, Southbridge, is president of the company, C. J. Buckley of Worcester is treasurer and J. M. Buckley of Worcester with the other two gentlemen named constitute the board of directors. The company will establish a plant here.

WORCESTER, MASS. — The Summer street foundry of the Wells Chemical & Bronze Works is to be razed in order to make room for a new building to be erected on the site by Armour & Co. The Wells company has purchased property at Harding and Temple streets, Worcester, and will erect a new foundry, 40 x 60 feet, contract for which has been let to Edward D. Ward, building contractor, Worcester. The new foundry will be of brick and mill construction and will be one story and basement.

ANSONIA, CONN.—The Farrel Foundry & Machine Co. will build a brick and steel erecting shop.

PAWTUCKET, R. I.—Additions will be made to the plant of the Phillips Insulated Wire Works. Buildings are to cost $100,000. Plans call for a brick mill two stories and basement, 200 x 110 and 50 x 150 feet; a mill three stories and basement 40 x 60 feet and a two-story power house 40 x 66 feet.

ALBANY, N. Y.—The Niagara Coke Co. has been incorporated with a capital of $3,500,000 to deal in coke; by F. M. Watrous, H. L. Wehring, J. F. Rogan, 188 Hull street, Brooklyn.

BUFFALO.—The Lackawanna Bridge Co. recently was awarded 400 tons of steel for the proposed addition to the plant of the Seneca Iron & Steel Co., 51 Erie County Bank building. Plans are completed.

BUFFALO.—Robert J. Reidpath & Sons, Builders' Exchange, are preparing plans for an addition to the plant of the King Sewing Machine Co. The foundry is to be 70 x 117 feet, one-story, and other buildings 30 x 150 feet and 30 x 40 feet.

FULTON, N. Y.—The E. W. Pittman Co., Lawrence, (Mass., has been awarded a contract for erecting the two-story 100 x 135 foot dye house and power house for the American Woolen Co.; cost $50,000.

HAMBURGH, N. Y.—Meyer & Meyer, Depew, N. Y., have been awarded contract for erecting a one-story 100 x 100-foot factory for manufacturing farming implements. Architects, Lansing, Bley & Lyman, Prudential building, Buffalo; owners, Renthen Mfg. Co., Inc.

NEW ROCHELLE, N. Y.—The New Rochelle Foundry Corporation will build a foundry 65 x 80 feet.

SYRACUSE, N. Y.—Gooley & Edlund have been incorporated with a capital of $40,000 to deal in iron, steel manganese, copper and lumber; by A. J. Briggs, J. A. Edlund, M. J. Gooley.

BUTLER, PA.—The Daubenspeck Mfg. Co., incorporated with capital of $10,000; machinery; by Frank W. Clark, Roy R. McIntyre, D. H. Sutton, L. M. Cumberland, W. A. Hartman, Theodore A. Mueller, P. E. Daubenspeck, Butler.

JOHNSONBURG, PA.—The plant of the Johnsonburg Machine Co. was practically destroyed by fire June 9. The foundry, machine shop, pattern shop and office building were damaged.

JOHNSTOWN, PA.—Hiram Swank's Sons has been incorporated with a capital of $200,000 to make brick; by Albert F. Swank, Milton R. Swank, Ralph L. Swank, J. Webster Swank, Johnstown.

PHILADELPHIA. — The Turner Concrete Steel Co. contemplates construction of a two-story and basement building, 98 x 240 feet, of reinforced concrete, steel, brick and terra cotta, to cost $150,000.

PITTSBURGH.—The Federal Coal & Coke Co. has been incorporated with a capital of $5,000; by K. G. Snyder, Pittsburgh, D. N. Crawford and R. A. Crawford, McKeesport.

PITTSBURGH.—The Eastern Mineral & Mfg. Co., capital $5,000, has been incorporated by John W. Lawrence, John E. Hutchenson and Grayson M. Metz, all of Aspinwall, Pa. The charter lists chemical ores, by-products, etc., as the line offered by this company.

BELVIDERE, N. J.—The Janson Steel and Iron Co., Belvidere, N. J., has filed a certificate of dissolution with the Secretary of State. The officers of the corporation were: President, Joseph Janson, and secretary and treasurer, Valentine Janson, both of Columbia, Pa.

HOPEWELL, N. J.—The city of Hopewell will soon receive bids for the erection of a new pumping plant.

MT. HOPE, N. J.—The Empire Steel & Iron Co. will double the capacity of its iron ore milling plant, it is reported.

NEWARK, N. J.—Plans are being completed for a new foundry, 50 x 125 feet, to be erected for Cyrus Currier & Son. The building is to be of brick, with steel frame and cement tile roof. A traveling crane will serve the foundry floor and an overhead monorail system will extend from the foundry to the store yard and the cleaning department. This monorail system also will be used for shipping. The cupola charging floor will be 18 feet above the yard level and will be equipped with a bucket elevator for bringing up the raw materials for charging. Coke bins are to be provided under the charging floor. Sand and clay bins, which will be accessible from the foundry floor, also will be located

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THE STEEL IMPROVEMENT CO., Cleveland, Ohio

under the charging platform. A foundry office and wash room and rest room, also are to be provided. The engineer is Walter Kidde, 140 Cedar street, New York, who recently completed the fine new plant of the Barlow Foundry Co. in Newark.

TRENTON, N. J.—Contractors Burton & Burton have been awarded the contract for the building of the new home for Trenton Lodge of Moose. The contract price is $54,800.

TRENTON, N. J.—The Maclewee Electric Co., has been incorporated in the Mercer County Clerk's office here to take over the going business of the Eastern Electric company. The capital stock is placed at $100,000 divided into 10,000 shares at $10 each. William S. Maclewee holds 1,498 shares, while Henry M. Hartman and Frederick R. Brace each own one share.

BALTIMORE.—The McShane Bell Foundry Co. which recently bought the Baltimore Hub Wheel plant on the Belt Line railroad, will erect a foundry building as an addition to the plant, to be of brick and steel, 72 x 76 feet. The buildings formerly comprising the Hub company's group will be used in the manufacture of brass and plumbing goods.

WASHINGTON.—Bids will be received 10:30 a. m., June 25 by Major F. C. Boggs of the Isthmian Canal commission for steel plates, sheet lead, etc., under canal circular No. 857.

CENTRAL STATES

ALLIANCE, O.—The McCaskey Register Co., cash registers; $3,000,000 capital; by K. F. Pollock, W. E. Dunning, T. C. Uran, F. E. Henry Jr., N. Haycock.

BARBERTON, O.—Bids will be advertised this week for erection of commercial lighting system here. R. A. Long is superintendent of the plant.

CINCINNATI.—Bids will be received until 2 p. m., July 2, by Lieutenant Colonel H. Jervey, United States engineer, for steel dump scows.

CINCINNATI.—The contract for the structural steel to be used in the construction of the Glendale waterworks, Glendale, a suburb of Cincinnati, has been awarded through Stegner, Hughes & Alves, architects, to the Pittsburgh-Des Moines Bridge & Iron Works.

CINCINNATI.—Plans have been completed for the construction of an addition to the plant of the Andrew Jergens Co., Cincinnati, which will be 99 x 120 feet, four stories. It will be entirely of concrete, and the only steel needed will be for re-inforcing purposes. The cost will be $45,000.

CINCINNATI.—A new bridge to take the place of the present structure is to be constructed across the Licking river connecting Newport and Covington by the Cincinnati, Covington Light & Traction Co. It is proposed to issue $200,000 worth of bonds to pay for the improvement.

CINCINNATI.—Bids are ready to be received for the construction of a new building for the Longview Hospital, Carthage, a suburb of Cincinnati, which will be 331 feet long, two stories. The cost will be $110,000. Elzner & Anderson, architects, of Cincinnati, are in charge of construction.

CLEVELAND.—The Jiffy Jack Co. has been incorporated with a capital of $50,000 to manufacture automobile accessories; by J. P. Engle, E. K. Harpster, M. F. Thompson, E. A. Edwards and N. B. Wildman.

CLEVELAND.—The Tidewater Construction Co. has been awarded a contract for an addition to the cold storage facilities of the Sheriff Street Market & Storage Co. It will be an eight-story structure; building and land represent an outlay of $200,000.

DELAWARE, O.—The Greer Road Machine Co. is planning a foundry; Robert Greer is manager.

FREMONT, O.—County surveyor Wm. Schepflin, is preparing plans for the new Tindall bridge to be built on the site of the old structure swept away by the floods. The bridge will be 330 feet long, and 16 feet wide.

GREENVILLE, O.—The Greenville Electric Light & Power Co. has asked the state utilities commission for authority to issue $28,000 of common stock for installing a new turbine engine and other improvements.

LISBON, O.—Plans are being prepared for a steel bridge over Dry Run at East Liverpool; bids to be advertised as soon as plans are ready.

MT. GILEAD, O.—The Hydraulic Press Mfg. Co., has built a brass foundry 30 x 90 feet for casting brass valves and fittings and for contract work. The concern has also recently completed an erecting shop 80 x 120 feet, equipped with testing machinery.

TOLEDO, O.—The Universal Machine Co. has increased its capital stock from $125,000 to $200,000.

TOLEDO, O.—The Pixley Safe & Lock Co. incorporated; capital $7,500;; by C. B. Mason, C. H. Pixley Jr., J. W. Taylor, Mrs. C. H. Pixley Jr., and L. J. Metzger.

TOLEDO, O.—The Standard Electric Stove Co. has been incorporated to manufacture electric stoves; $100,000; by P. C. Tiedeman, S. L. Kelly, L. D. Smith, C. S. Turner and F. M. Bostater.

YOUNGSTOWN, O.—The Electrical Maintenance Co. has increased its capital stock from $25,000 to $50,000.

ZANESVILLE, O.—The commissioners have been advised that plans for the Gaysport and Brush creek bridges have been approved by the secretary of war. The contract for the first has been awarded to the Capitol Construction Co., of Columbus and for the second to E. W. Lane of Newark, who will proceed with the construction.

KEYSTONE, W. VA.—The Keystone Wagon Co. has been incorporated to manufacture wagons; $10,000; by C. C. Hale, W. E. Stuart, S. P. Stuart, Annie F. Stuart and Mike Warincak, all of this city.

PARKERSBURG, W. VA.—City Council has authorized franchise for the Belpre bridge to go over Fifth street; length 449 feet, width 32 feet.

LOUISVILLE, KY.—Louisville Gas & Electric Light Co. is making arrangements to erect a $478,000 annex to its power plant, which it will equip with the most modern electric generating machinery. Overhead bunkers extending east and west along Water street will be built to connect with the elevated steam railway tracks.

EVANSVILLE, IND. — Clifford Shopbell, Furniture building, is making plans for the Evansville Sanitarium Co. for a sanitarium of reinforced concrete, three stories, 40 x 180 feet, to cost $150,000.

FT. WAYNE, IND.—Henry Kaiser, 8 Swinney block, has the general contract for a theater and office building of brick and steel, 75 x 130 feet, for Weil Bros. & Co., 324 Columbia street, to cost $40,000.

GARY, IND.—The Scrap Iron & Metal Co., has been organized recently with a capital of $2,500. H. P. Shararsky, M. I. Goodman and M. L. Goodman are the incorporators.

INDIANAPOLIS.—The American Machine, Engine & Tool Co., has been incorporated; $5,000; by Richard Gaul, Alexander Burkhart and Chas. G. Sheets.

INDIANAPOLIS.—Chas. R. Weatherhogg, architect, 41 Hamilton National Bank bldg., has plans completed for a hotel and mercantile building, 66 x 127 feet, 11 stories, fireproof, to cost $200,000.

KENDALLVILLE, IND.—J. N. Godall & Son, of Peru, has the general contract for a city hall and fire station, 50 x 100 feet, of brick and steel, to cost $30,000.

MUNCIE, IND.—The commissioners have awarded contracts to the Indiana Bridge Co., for extending the Washington and Elm street bridges for $5,886, and $5,115, respectively. The contract for constructing the Weaver road of tarvia has been awarded to Frank Hines.

SEBRING, IND.—Commissioners of Mahoning county will construct a bridge on 12th street at the crossing of Ohio ave. and a bridge on the Johnson road, one mile north of this town.

SOUTH BEND, IND. — I. A. Barclay, Niles, Mich., has made plans for J. Seeberger for a mercantile building of brick and steel, two stories, 66 x 128 feet, to cost $30,000.

SOUTH BEND, IND.—Perkins, Fellows & Hamilton, 6 North Clark street, have made plans for a bank and office building for the Farmers Security Co. of reinforced concrete, nine stories, 88 x 165 feet, to cost $350,000.

WINCHESTER, IND.—Henry F. Wood, auditor of Randolph county, will open bids July 10 for the construction of bridge abutment and repairs on six bridges in this county, consisting of 3 new structures, and repairs on 3 others, plans for which are on file with county engineer.

CHICAGO.—The Chicago Electric Foundry Co. has been incorporated; $5,000; by Howard S. Bishop, Wm. A. Hartfield and Spencer L. Adams, 69 West Washington street.

CHICAGO. — Wm. F. Crilley, 35 South Dearborn street has the contract for a substation at Eighty-second street and Halsted, reinforced concrete and steel, one story and basement, 50 x 60 feet, for the Chicago Surface Lines Co.

CHICAGO, ILL.—The Chicago Telephone Co., 212 Washington street, has let the general contract to the James Black Masonry & Construction Co. for a telephone exchange at Oak Park, of steel, tile and reinforced concrete, 82 x 49 x 110 feet, to cost $65,000.

CLINTON, ILL.—The Illinois Central railroad has appropriated $700,000 for improvements here to include new and enlarged shop buildings, yards, a loop and additional side tracking. A second main track eight miles long, from Clinton to Wapelia, has also been authorized.

ELGIN, ILL.—James D. Dibelka, 29 South La Salle street, is taking bids for a psychopathic building at Elgin Insane Asylum, 35 x 96 x 31 x 51, of brick, steel and reinforced concrete, to cost $50,000.

PEORIA, ILL.—The Progressive Engineering Co. has been incorporated to manufacture and deal in machinery; $150,000; by Clayton J. Ewing, Geo. Beatty and Wm. H. Webster.

QUINCY, ILL.—The Modern Iron Works, which recently took over the Hayton foundry, proposes constructing a foundry building 70 x 160 feet, and would be glad to hear from engineers and contractors.

ALMA, MICH.—The Alma Standard Foundry & Mfg. Co. is enlarging its plant, owing to increased business; the addition is 34 x 56 feet, one-story, and will be used as a molding room. C. L. Messinger is secretary and treasurer of the concern.

HOLLAND, MICH.—The Holland Furnace Co. is planning to double the capacity of its plant by the erection of a large addition to its buildings on East Twenty-second street.

MUSKEGON HEIGHTS, MICH. — The Pyle Pattern Works, which recently built an extension to its plant will use this new department for foundry purposes, including a molding floor, cleaning and core room. The molding floor will measure 50 x 150 feet.

BAYFIELD, WIS.—H. C. Weaver, T. A. Bruett and F. S. Blackmarr have incorporated

the Bay Iron Works with $15,000 capital and will enlarge the plant at once.

BEAVER DAM, WIS.—A material warehouse, 25 x 100 feet, and a second story addition to the pattern storage vault are being erected at the plant of the former Beaver Dam Malleable Iron Co.

BELOIT, WIS.—The P. F. Murk Foundry Co., South Beloit, is having plans made for the erection of a 60 x 80 foot addition next fall. It will be of concrete block construction and work will start about Sept. 1.

EAU CLAIRE, WIS.—Plans are being prepared by George .Ausumb, architect, 14 E. Jackson Boulevard, Chicago, for a $100,000 city hall and a $25,000 armory and auditorium building for the city of Eau Claire. Bids will be taken late in June or early in July, depending upon the progress in plans.

EAU CLAIRE, WIS.—The plant of the A. E. White Machine Works, producing sawsets and swages and a line of other sawmill and machine shop specialties, will be more than doubled in size. The concern has leased the Losby building, part of which it has been occupying for some time and will equip the entire building for its purposes. The force will be increased to 50 operatives. The building is now being remodeled and purchases of tools and other machinery will be made after June 20. A. E. White is general manager.

KAUKAUNA, WIS.—Daniel Rounseville, chief engineer of maintenance for the C. & N. W. R. R. Co., is authority for the statement that the railway will rebuild its roundhouse at Kaukauna, install new turntables, add several new boilers and make other improvements at the division headquarters here.

MILWAUKEE, WIS.—The county board of supervisors has started mandamus proceedings to force the Chicago, Milwaukee & St. Paul to build a steel overhead bridge in the old Grand avenue viaduct. The former bridge collapsed two years ago.

MILWAUKEE, WIS.—Eugene R. Liebert, architect, will close bids at the end of the week for the construction of the new shop for Logemann Bros., machinists, at 32d and Burleigh streets, to cost $12,000. It will be 1-story, 50 x 200 feet. Previously reported.

MILWAUKEE, WIS.—The board of public works will take bids after July 1 for the erection and complete equipment of the new Third Ward natatorium at Detroit and Huron streets. It will cost $40,000. Fred G. Simmons is commissioner of public works.

MILWAUKEE, WIS.—The county board of supervisors has instructed Louis G. Widule, county clerk, to advertise for bids for the erection of the new House of Correction group at North Milwaukee, to cost $650,000. Leehouts & Guthrie, Milwaukee, are the architects. Previously noted.

MILWAUKEE, WIS.—Schnetzky & Son, architects, are making plans for a $100,000 dock, warehouse and machine shop for the Chicago, Racine & Milwaukee Line at the foot of Erie street. It will be 112 x 300 feet in size and the buildings will be of steel frame, with brick and concrete.

MILWAUKEE, WIS.—The state board of agriculture, Madison, J. C. MacKenzie, secretary, is making tentative plans for the erection of several steel and brick exhibition hall and cattle buildings to replace the concrete and cement block and frame structures destroyed by the cyclone on May 31.

MILWAUKEE, WIS. — The Milwaukee Printers Roller Co., 368 Milwaukee street, is about to take bids for the erection and equipment of a new $25,000 factory on Greenbush street, near Virginia, according to plans by Architect Chas. J. Keller. It will be a three-story structure, 50 x 60 feet, of solid brick and steel.

MILWAUKEE, WIS.—Engineers of the Chicago, Milwaukee & St. Paul Railway Co. are making tentative plans for the construction of a steel and concrete dock and warehouse, 60 x 900 feet, on the site of Elevator B, Kneeland canal, near Sixth street viaduct. B. M. McNaney is superintendent of terminals at Milwaukee.

MILWAUKEE, WIS.—Because of difficulty over issuing bonds for a project involving county and city rights, the Milwaukee common council has indefinitely postponed the proposition of bonding the city for $500,000 to build a new steel viaduct over Menominee valley, connecting 35th street and 30th avenue.

MILWAUKEE, WIS.—The Saxe Bros. Amusement Co. is having plans prepared for a $650,000 theater and office building to be erected on Third street, between Grand avenues and Wells street. It will be of steel and tile construction, 10 or 12 stories, 60 x 120 feet. Contracts will be awarded about July 15. Thomas E. Saxe is president.

MILWAUKEE, WIS.—The contract for all structural steel and architectural iron required for the new $350,000 theater and office building being erected by the Fred Miller Brewing Co. at Grand avenue and Fifth street, Milwaukee, was awarded to the Milwaukee Structural Steel Co., Milwaukee, by Wolff & Ewens, architects. It will be 142 x 204 feet in size, of brick, steel and concrete.

MILWAUKEE, WIS.—A. F. Wagner, who has conducted an architectural iron works at 519 Market street for many years, has organized the business as a corporation and will build a new shop on North Water street. The concern is styled the A. F. Wagner Architectural Iron Works and the capital stock is $25,000. A. F. Dreis and W. E. Eichfeld are co-incorporators. The new shop will be of brick and steel construction, 69 x 90 feet in size, and cost about $15,000.

RACINE, WIS.—Chandler & Park, architects, Racine, have been commissioned to prepare plans for remodeling the Racine county courthouse, the cost of which is estimated at about $45,000.

REEDSBURG, WIS.—The common council awarded the contract for furnishing about 2,000 lineal feet of 4-inch pipe for water mains to James B. Clow & Sons, Chicago, at $26.80 per net ton.

SUPERIOR, WIS.—Mead, Morrison & Co. have been awarded the contract for rebuilding the bridge of the Great Northern ore dock, badly damaged by the windstorm of last week. The rigs on Northwestern dock No. 1, M. A. Hanna dock and Island Creek Coal Co. dock were badly damaged and will have to be rebuilt.

ST. LOUIS.—H. A. Wagner, 701 Victoria building, is taking bids on a hotel of brick and reinforced concrete, eight stories, 60 x 100 feet, to cost $150,000.

ST. LOUIS.—T. J. Bradshaw, 615 International Life building, has made plans for an auto sales building of reinforced concrete, two stories and basement, 40 x 125 feet, to cost $40,000.

ST. LOUIS.—J. H. Hirschstein, 721 Olive street, has taken bids for mercantile building for the Haas Trimmed Hat Co., 1900 Pine street, fireproof, seven stories, 100 x 154 feet, with metal window frames, fire doors and rolling steel doors, to cost $100,000.

ST. PAUL, MINN.—The St. Thomas Club has let the general contract to Butler Bros., New York Life Bldg., for a brick concrete and steel armory and gymnasium, 100 x 232 feet, to cost $80,000.

ST. PAUL, MINN.—Chas. Skooglun, 505 Ryan Bldg., has the general contract for an office building at 386 Wabasha street, of brick and steel, five stories, 99 x 100, to cost $50,000.

SOUTHERN STATES

RICHMOND, VA.—The Wood Newspaper Machinery Corporation has been chartered with a capital of $4,750,000 to manufacture and repair typesetting machinery and printing presses. Andrew D. Christian is president and Earnest B. Flippen is secretary, both of Richmond.

NEW ORLEANS.—Major E. H. Schulz, U. S. engineer, will receive bids until 11 a. m. July 1, for dredge arm and spare parts for the U. S. Dredge New Orleans.

NASHVILLE, TENN. — The Holly Iron Co. has been incorporated with a capital of $30,000; by G. C. Powell, Andrew J. Powell, George W. Powell, L. E. Powell and T. A. Powell.

WESTERN STATES

SIOUX FALLS, S. D.—Carl Cook is taking bids for a bank and office building, fireproof, nine stories, 86 x 150 feet, to cost $200,000.

BILLINGS, MONT.—The Security Bridge Co., of Minneapolis, was awarded the contract for constructing ten steel bridges in this county by the county commissioners at $15,731.20.

BOISE, IDA.—Contract for constructing 14 miles of railroad grade up Moore Creek for the Payette Lumber Co. has been awarded to the Wasatch Grading Co., of Salt Lake; contract for awarding steel and building bridges to be awarded later.

LEWISTON, IDA.—E. J. Rounds Construction Co., 332 Walker buildings, Seattle, has been awarded the contract for the construction of the terminal buildings of the Northern Pacific railway at this point at an estimated cost of $60,000.

SEATTLE, WASH.—The Port of Seattle Commission has awarded a contract to the Hofius Steel & Equipment Co. for rails and appurtenances, involving $25,000.

SEATTLE, WASH.—Bids will be received up to July 29 by the board of county commissioners of King county for the construction of a court house to cost approximately $1,000,000. Alternate bids will be asked for two additional stories to be occupied by the city of Seattle.

SPOKANE, WASH.—The question of purchasing additional water meters soon will be up for decision by the city authorities.

LOS ANGELES.—The Griffin Car Wheel Co. has awarded a contract for erecting a reinforced cement foundry building at Vern, Cal., to Carl Leonhardt, Los Angeles.

LOS ANGELES, CAL.—U. S. Reclamation Service will receive bids until 2 p. m. July 14 for one vertical alternating current generator for the Salt river project.

SAN FRANCISCO.—The Swan Carburetor Co., incorporated with capital of $200,000; carburetors; by H. S. Hutchings, Y. M. C. A. building; E. M. Boynton and B. W. Boynton.

TRADE NOTES

MILLBURY, MASS.—Charles Buck Edge Tool Co. is enlarging its facilities for marketing its output. Robert T. Pollock, a member of the firm, says the company expects a large increase in production within the next few months, which will materially increase the number of employees.

WAUPACA, WIS.—The water and light commission has made the following contracts for waterworks equipment: 5,300 feet of 6-inch mains, United States Cast Iron Pipe & Foundry Co., at $24 per net ton delivered; fittings, 2.75c per pound. Gate valves, water boxes, etc., Murphy Supply Co., Green Bay, Wis.; lead and jute, James B. Clow & Sons, Chicago, at 5 cents per pound; hydrants, same, at $26 each; two 700-gallon pumps and two 40-H. P. electric motors, Allis-Chalmers Mfg. Co., Milwaukee, at $1,850.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery Through Third Quarter.)

Bessemer, valley	$14.00
Bessemer, Pittsburgh	14.90
Basic, Pittsburgh	13.90
Basic, eastern Pa.	14.00
Malleable, Pittsburgh	13.90 to 14.40
Malleable, Chicago	14.25
Malleable, Philadelphia	15.50 to 15.75
Malleable, Buffalo	13.00 to 13.50
No. 1X Philadelphia	15.00 to 15.25
No. 2 foundry, Pittsburgh	13.90 to 14.40
No. 2 foundry, Cleveland	14.25
No. 2 foundry, Ironton	13.50
No. 2 foundry, Chicago	14.25
No. 2X foundry, Philadelphia	14.75 to 15.00
No. 2X foundry, New York	14.50 to 14.75
No. 2X foundry, Buffalo	12.75 to 13.00
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, New York	14.25 to 14.50
No. 2 plain, Buffalo	13.50 to 13.75
No. 2 southern, Birmingham	10.25 to 10.50
No. 2 southern, Cincinnati	13.75 to 14.25
No. 2 southern, Chicago	14.85 to 15.85
No. 2 southern, Philadelphia	15.00 to 15.25
No. 2 southern, Cleveland	14.85 to 15.35
No. 2 southern, New York	14.75 to 15.00
No. 2 southern, St. Louis	14.50 to 15.00
Virginia, 2X, Philadelphia	15.30
Virginia, 2X, Jersey City	15.85 to 16.10
Virginia, 2X, New Eng., all rail	16.25
Gray forge (eastern Pa.)	13.75 to 14.00
Gray forge, Pittsburgh	13.65
Gray forge, Birmingham	9.25 to 9.75
Silveries, 8 per cent, Cleveland.	17.55
Silveries, 5 per cent, Birmingham	12.50
Silveries, 5 per cent, Chicago	16.85
Standard low phos., Phila.	20.50
Lebanon low phos., furnace	17.00 to 17.50
Low phos., Pittsburgh	21.65 to 21.90
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	16.00 to 17.00
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent.	$3.75
Mesabi Bessemer, 55 per cent.	3.50
Old range, non-Bess., 51½ per cent.	3.00
Mesabi, non-Bessemer, 51½ per cent.	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent.	7 to 8c
Foreign non-Bess., 50 to 65 per ent.	7 to 8c

COKE

(At the ovens.)

Connellsville furnace	$1.75 to 1.85
Connellsville fur. contr.	1.85 to 2.00
Connellsville foundry	2.35 to 2.60
Connellsville fdy., contr.	2.40 to 2.65
Wise county furnace	1.90 to 2.10
Wise county foundry	2.25 to 2.75
Pocahontas furnace	1.90 to 2.05
Pocahontas foundry	2.25 to 2.40
New River, foundry	2.75 to 3.50
New River, furnace	2.20 to 2.35

FERRO-ALLOYS

Ferro-manganese, Baltimore	$38.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Bess. billets, Pbgh. and Yn.	$19.50 to 20.00
Open-hearth bil., Pbgh. and Yn.	19.50 to 20.00
Open-hearth bil., Phila.	21.90 to 22.40
Bess. sheet bars, Pbgh. and Yn.	20.50 to 21.00
Op.-h'th sh. bars, Pbgh. & Yn.	20.50 to 21.00
Forging billets, Phila.	26.40 to 27.40
Forging billets, Pittsburgh	25.00
Wire rods, Pittsburgh	25.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago.	21.50 to 22.50
Angle bars, st. sect. Pbgh., base	1.50c
Angle bars, st., sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.40c to 1.45c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh.	1.12½c to 1.15c
Structural shapes, Chicago.	1.28c to 1.33c
Structural shapes, Philadelphia.	1.25c to 1.30c
Structural shapes, New York.	1.26c to 1.31c
Structural shapes, San Francisco.	2.00c to 2.05c
Tank plates, Chicago.	1.28c to 1.33c
Tank plates, Pittsburgh.	1.10c to 1.15c
Tank plates, Philadelphia.	1.25c to 1.30c
Tank plates, New York.	1.26c to 1.31c
Bars, soft steel, Pittsburgh.	1.12½c to 1.15c
Bars, soft steel, Chicago.	1.28c to 1.33c
Bars, soft steel, Philadelphia.	1.30c
Bars, soft steel, New York.	1.31c
Hoops, carloads, Pittsburgh.	1.25c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Baltimore	14½ cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Minneapolis and St. Paul	32 cents
Denver	67½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, plates and shapes	80 cents

Hoops, less carloads, Pittsburgh	1.30c
Bands, Pittsburgh	1.15c
Shafting, carloads, Pbgh., disc.	66 to 67
Shaft'g less carl'ds, Pbgh., disc.	63 to 64
Bar iron, Chicago.	1.10c to 1.12½c
Bar iron, Philadelphia.	1.20c to 1.25c
Bar iron, New York.	1.25c to 1.30c
Bar iron, Cleveland.	1.20c to 1.25c
Bar iron, Pittsburgh.	1.25c
Hard steel bars, Chicago.	1.25c to 1.30c
Smooth finish'g mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh.	1.80c to 1.90c
No. 28, black, Chicago.	1.98c to 2.03c
No. 28, tin mill, black, Pbgh.	1.80c to 1.90c
No. 28, galvanized, Pbgh.	2.75c to 2.85c
No. 28, galvanized, Chgo.	2.93c to 2.98c
No. 10, blue annealed, Pbgh.	1.35c
No. 10, blue annealed, Phila.	1.50c
Tin plate, 100 lb., coke, base.	$3.30 to 3.40

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv. Butt-weld.
Steel, ⅜ to 3 inches.	80	71½
Iron, ⅜ to 2½ inches.	70	61
	Lap-weld.	
Steel, 2½ to 6 inches.	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches.	72
Iron, 3½ to 4½ inches.	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh.	$1.50 to 1.55
Wire nails, retailers, Pittsburgh.	1.55 to 1.60
Plain wire, jobbers, Pittsburgh.	1.30 to 1.35
Plain wire, retailers, Pittsburgh.	1.35 to 1.40
Galvanized wire, jobbers, Pbgh.	1.70 to 1.75
Galvanized wire, retailers, Pbgh.	1.75 to 1.80
Polished staples, Pbgh.	1.50 to 1.55
Galvanized staples, Pbgh.	1.90 to 1.95
Barb wire, painted, jobbers, Pbgh.	1.50 to 1.55
Barb wire, painted, retail'rs, Pbgh.	1.55 to 1.60
Barb wire, galv., retailers, Pbgh.	1.95 to 2.00
Barb wire, galv., jobbers, Pbgh.	1.90 to 1.95

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 10; cut threads, 80 and 5; larger or longer, 75 and 10.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled, 80 and 15; cut, 80 and 10; larger or longer, 75 and 15.

Gimlet and cone point lag or coach screws, 80 and 20.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, C. & T. square, blank or tapped, $6 off; hexagon, blank or tapped, ⅜ inch and larger, $7.20; ⅜-inch and smaller, $7.80.

RIVETS

Structural rivets, Pbgh.	1.55c to 1.65c
Structural rivets, Chgo.	1.73c to 1.78c
Boler rivets, Pbgh.	1.65c to 1.75c
Boiler rivets, Chgo.	1.83c to 1.88c

SCREWS

(New York.)

Lag, gimlet and cone point	80 and 20
Coach, gimlet point	80
Standard jack	70 and 10
Mch., cut thread, flat head	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and 40 and 10
Mch., rolled thread, flat head or round head	80 and 10
Set screws, iron	75 and 10 and 10
Set screws, steel, per cent advance over iron	25
Square head cap screws	70 and 10 and 10
Hexagon head cap screws	70 and 10 and 10
Fillister head cap screws	60 and 10 and 10
Flat head wood screws	10 and 10 and 5
Round head wood screws	10 and 10 and 5

WASHERS

(Discounts, Iron or Steel, to Jobbers, Cleveland.)

⅛-inch	$7.25
⅜-inch	7.00
½-inch	7.00
⅝-inch	7.00
¾-inch	7.00

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¾-inch and larger	1.25c
⅝-inch	1.30c
½-inch	1.35c
⅜-inch	1.50c
¼-inch	1.75c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)—

	Discount.
American carpet tacks	90 and 20 and 10
American cut tacks	90 and 20 and 10
Railroad tacks	90 and 40
Gimp tacks	90 and 20 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel	47½ and 2½
Bright, Iron and steel	55 and 2½

TRIANGLE REINFORCING MESH

(Per 100 square feet f. o. b. mill, car loads.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35 plain	1.17c
No. 35 galvanized	1.30
No. 39, plain	3.05
No. 39, galvanized	3.38
No. 43, galvanized	1.23
No. 43, plain	1.10

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch, galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch, galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Three to 24 in., Cleveland	$22.35 to 22.80
Four-inch, water, Chicago	26.50
Six to 12 inches, Chicago	24.50
Larger sizes, Chicago	24.00
Six inch, water, New York	20.50 to 21.50
Four-inch, water, Birmingham	21.50
Six-inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.85c
Steel bars, Philadelphia	1.65c to 1.70c
Steel bars, New York	1.80c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, Cincinnati	1.65c to 1.75c
Iron bars, Philadelphia	1.60c to 1.65c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.90c
Shapes and plates, Philadelphia	1.65c to 1.70c
Shapes and plates, New York	1.85c
No. 10 blue ann. sheets, Chgo	1.95c
No. 10 blue ann. sheets, Cleve.	2.15c
No. 10 blue ann. sheets, Cinci.	1.95c to 2.05c
No. 28 black sheets, Chgo	2.45c
No. 28 black sheets, Cleveland	2.60c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 galv. sheets, Chgo	3.45c
No. 28 galv. sheets, Cleveland	3.60c
No. 28 galv. sheets, Cincinnati	3.45c to 3.55c

IRON AND STEEL SCRAP

(Net tons.)

No. 1 railroad wrought Chgo	$ 9.00 to 9.25
No. 1 railroad wrought, Cleve	9.50 to 10.00
No. 1 railroad wrought, St. L	7.75 to 8.00
No. 1 railroad wrought, Cinci	8.00 to 8.50
No. 2 railroad wrought, Chgo	8.50 to 8.75
No. 2 railroad wrought, St. L	7.50 to 7.75
Arch bars and transoms, Chgo	12.00 to 12.50
Arch bars and transoms, St. L	11.00 to 11.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Knuckles, coup. and sp'gs, St. L.	9.00 to 9.25
Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo	12.25 to 12.50
Steel car axles, St. Louis	11.50 to 11.75
Locomotive tires, Chicago	9.75 to 10.00
Locomotive tires, St. Louis	9.00 to 9.50
Cut forge Chicago	8.50 to 8.75
Pipes and flues, Chicago	6.75 to 7.00
Pipes and flues, Cleveland	7.75 to 8.25
Pipes and flues, St. Louis	6.50 to 7.00
No. 1 cast, Chicago	10.00 to 10.50
No. 1 cast, Cleveland	10.00 to 10.50

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley furnaces	1.20
Cincinnati	2.00

No. 1 cast, Cincinnati	$ 9.25 to 9.75
No. 1 cast, St. Louis	10.00 to 10.50
No. 1 busheling, Chicago	7.50 to 7.75
No. 1 busheling, Cleveland	8.75 to 9.25
No. 1 busheling, Cincinnati	6.00 to 6.50
No. 1 busheling, St. Louis	7.50 to 8.00
No. 2 busheling, Chicago	6.00 to 6.25
No. 1 boiler plate, cut, Chgo	6.50 to 7.00
No. 1 boiler plate, cut, Buffalo	9.00 to 9.50
No. 1 boiler plate, cut, St. L	6.00 to 6.50
Boiler punchings, Chicago	9.00 to 9.25
Cast borings, Chicago	4.75 to 5.25
Cast borings, Cleveland	6.00 to 6.50
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.00 to 4.50
Machine shop turnings, Chgo	5.25 to 5.50
Machine shop turnings, Cleve.	5.50 to 5.75
Machine shop turnings, Cinci	4.50 to 5.00
Machine shop turnings, St. L	4.50 to 5.00
Malleable, railroad, Chicago	9.00 to 9.50
Malleable, agricultural, St. Louis	7.25 to 7.50
Malleable, railroad, Chicago	9.25 to 9.75
Malleable, railroad, Cincinnati	6.50 to 7.00
Malleable, railroad St. Louis	8.00 to 8.25
Angle bars, iron, Chgo	11.75 to 12.25
Angle bars, iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chgo	8.25 to 8.75
Angle bars, steel, St. Louis	9.00 to 9.50
Stove plate, Chicago	9.00 to 9.50
Stove plate, Cleveland	8.00 to 8.25
Stove plate, Buffalo	9.75 to 10.00
Stove plate, Cincinnati	6.75 to 7.25
Stove plate, St. Louis	7.50 to 8.00
Bundled sheet, Cincinnati	4.75 to 5.25
Wrought iron pil'g plates, Clev.	13.00

(Gross Tons.)

Heavy melting steel, Pbgh	$12.00
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chicago	9.75 to 10.00
Heavy melting steel, Cleveland	10.25 to 10.75
Heavy melting steel, Cincinnati	9.00 to 9.50
H'vy melting steel, eastern Pa.	10.50 to 11.00
Heavy melting steel, New York	8.50 to 8.75
Heavy melting steel, St. Louis	11.00 to 11.50
Bundled sheet, Buffalo	6.25 to 6.50
Grate bars, Buffalo	9.50 to 10.00
Grate bars, New York	5.75 to 6.00
No. 1 railroad wr'ght, east. Pa.	12.50 to 12.75
No. 1 railroad wrought, Pbgh	11.50 to 12.00
No. 1 R. R. wght., New York	10.25 to 10.50
No. 1 R. R. wrought, Buffalo	11.00 to 11.50
Shafting, New York	12.00 to 12.50
Pipes and flues, New York	8.00 to 8.25
Pipes and flues, eastern Pa.	9.25 to 9.75
Mch. shop turnings, New York	5.75 to 6.00
Machine shop turnings, Buffalo	5.50 to 6.00
Mch. shop turnings, Pbgh	7.75 to 8.00
Mch. shop turnings, eastern Pa.	7.50 to 8.00
Cast borings, New York	5.75 to 6.00
Cast borings, eastern Pa.	8.00 to 8.50
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.00 to 8.25
Stove plate, (Jersey points)	8.50 to 8.75
Stove plate, Pittsburgh	10.00 to 10.25
Stove plate, eastern Pa.	8.50 to 9.00
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The Standardization of Machinery

(*Continued from page* 1102.)

turned out whenever there is a new lot to be done. Light work does not require a heavy lathe nor will it stand the heavy cuts of which the modern lathe is possible, so that unless we have standards for light and heavy lathes, it would be a hardship rather than a benefit. The sizes of spindles and bearings should be left to the designer and the buyer can select whatever he needs.

After we have considered the standardization of parts we can well spend a few moments on the question of names of machines and parts, especially the latter, for while many of us believe that the present naming of many of our machines is crude if not incorrect, there is little confusion caused by mistaking the kind of machine which may be meant, either in conversation or in writing. But when it comes to parts of machines, it is a very different story. Nearly every maker and user knows of exasperating delays in supplying and securing parts of machines owing to a lack of uniformity in names. This often necessitates the writing of several letters, and with machines standing idle, the cost of delays mounts up into large figures during a year.

Many manufacturers supply a list of parts of their machines and in most cases illustrate the part itself so that there can be little difficulty in distinguishing it. Unfortunately, however, few shops keep these lists where they are handy, and when it is necessary to send for a repair part they designate it by the terms used in that locality for similar pieces, as is very natural.

A little attention in the naming of machine parts would obviate much of this difficulty. It is a process of education, and if we will begin by naming parts according to the service they perform, much difficulty can be eliminated. This is already done to a considerable extent, as in the use of such terms as "lead" screw, "feed" rod, and similar names. Such names, however, as "cat head", "tumbler gear", "planer harp", etc., form a separate language which must be learned the same as Sanskrit or Esperanto.

Another example of confusion in this way is the naming of the handles by which a turret slide is advanced to the work. This is commonly known as a pilot wheel on account of its resemblance to the wheel used by a pilot in controlling the course of his vessel. In some parts of the country, however, it is known as a "turn-stile" and a "spider", although the latter name has a very different meaning to most of us.

If we could devise some means of designating the machine parts by the work they perform without having the names too cumbersome, it would seem as though the matter might be simplified, and at the present time, this appears to be more important than the naming of the machines themselves, however badly they may be in need of a more rational designation.

Another field of standardization that promises important benefits to the user is that of the electric motors designed to be applied to machines. At present, there is no uniformity in speeds, powers and general dimensions. Thus it is practically impossible to design the details for attaching a motor to a machine until the precise specification of the particular motor to be used are obtained from the motor builder. A great benefit would be conferred upon all motor users if the following points could be standardized: The voltage and speed for direct-current motors from, say ½ to 50 horsepower, the voltage, cycles and speeds for alternating-current motors for the same range of power, the outline of the feet with the location of bolt holes, the diameter of the armature shaft, size of keyway and distance from shaft shoulder to center of figure of motor, the distance from the center of the shaft to the bottom of the feet, and the general clearance dimensions for the outside of the motor. In 1910 these

details and others were considered by a committee of the National Machine Tool Builders' Association, co-operating with a similar committee of the Association of American Motor Manufacturers. A number of features were recommended, but these have not been put into effect. Meanwhile, motor users are subjected to annoying delays and difficulties in applying motors to machines.

It must not be thought that the standardization of machine details is a difficult matter. It is much more difficult in theory and in consideration than in adoption and application. Some ten years ago, the United Shoe Machinery Co. established a department to standardize details of the 250 or more machines that they built at that time. The machines under consideration had been built over a period of 36 or 40 years by a large number of different designers in many different shops. Thus no uniformity existed. In fact, it is safe to say that there was less uniformity in regard to general details of these machines than will be found among the details of machines of the same general class built today by representative manufacturers. For a generation, shoe machinery had been leased on royalty to the shoe manufacturer, and the machinery building company was under obligation to furnish spare parts. Thus changes in detail of necessity might interfere seriously with a well established business. However, the advantages for standardization were so great that the possible disadvantages were overweighed and the work started. It was carried through to completion during a period of about a year, and, although at first some little confusion and difficulty occurred in furnishing spare parts to old machines, these difficulties rapidly disappeared and the advantages of uniformity became apparent.

Standardization must never be undertaken in a weak-kneed fashion. It must be approached courageously, with the exercise of good judgment, but an appreciation that difficulties, if they arise, will be only temporary in character. It is far better to have some difficulty for a year or two than to hamper the use and applications of machines for a generation. Even though it is impractical to change the details on existing machines that have been on the market for some time, the newer details can be employed in fresh designs, which are constantly being brought out. After the lapse of a few years, the old order of things has disappeared and the new is firmly installed with its attendant advantages. The attitude should be one of attack when such a problem is presented, attack with the determination of finding one detail and making that uniform, instead of giving prolonged consideration to the possible difficulties and disadvantages.

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